Title: Pfu REPLICATION ACCESSORY FACTORS AND METHODS OF
USE
Inventors: Holly H. Hogrefe et al.
Application No.: Not Yet Assigned
Filed: April 20, 2004
Attorney Docket No.: 04121.0161-02000
Page 1 of 37 (Figure 1)

1 / 37

FIG. 1

Title: Pfu REPLICATION ACCESSORY FACTORS AND METHODS OF
USE
Inventors: Holly H. Hogrefe et al.
Application No.: Not Yet Assigned
Filed: April 20, 2004
Attorney Docket No.: 04121.0161-02000
Page 2 of 37 (Figure 2)

2 / 37

FIG. 2

Title: Pfu REPLICATION ACCESSORY FACTORS AND METHODS OF USE
Inventors: Holly H. Hogrefe et al.
Application No.: Not Yet Assigned
Filed: April 20, 2004
Attorney Docket No.: 04121.0161-02000
Page 3 of 37 (Figures 3 and 4)
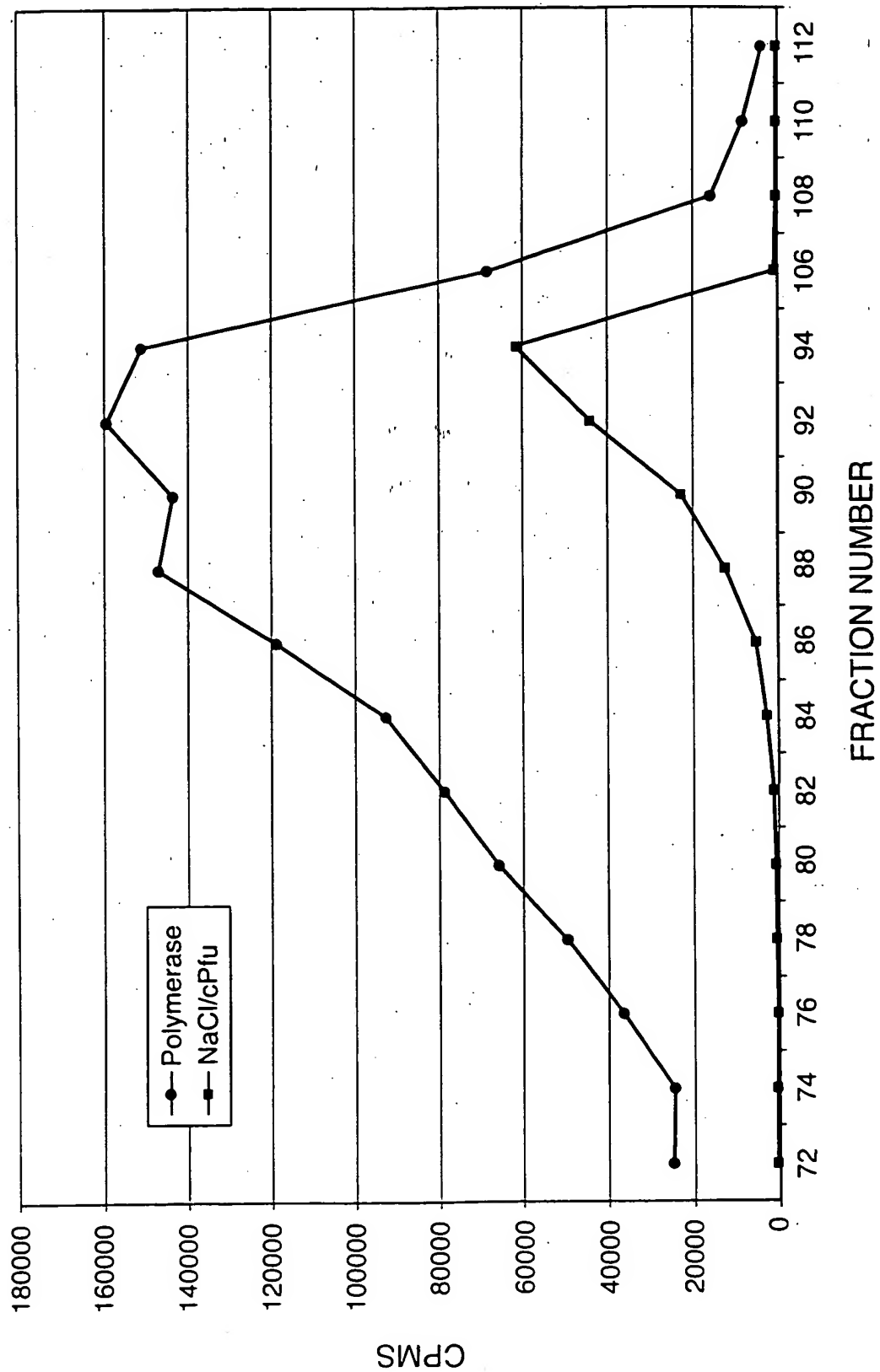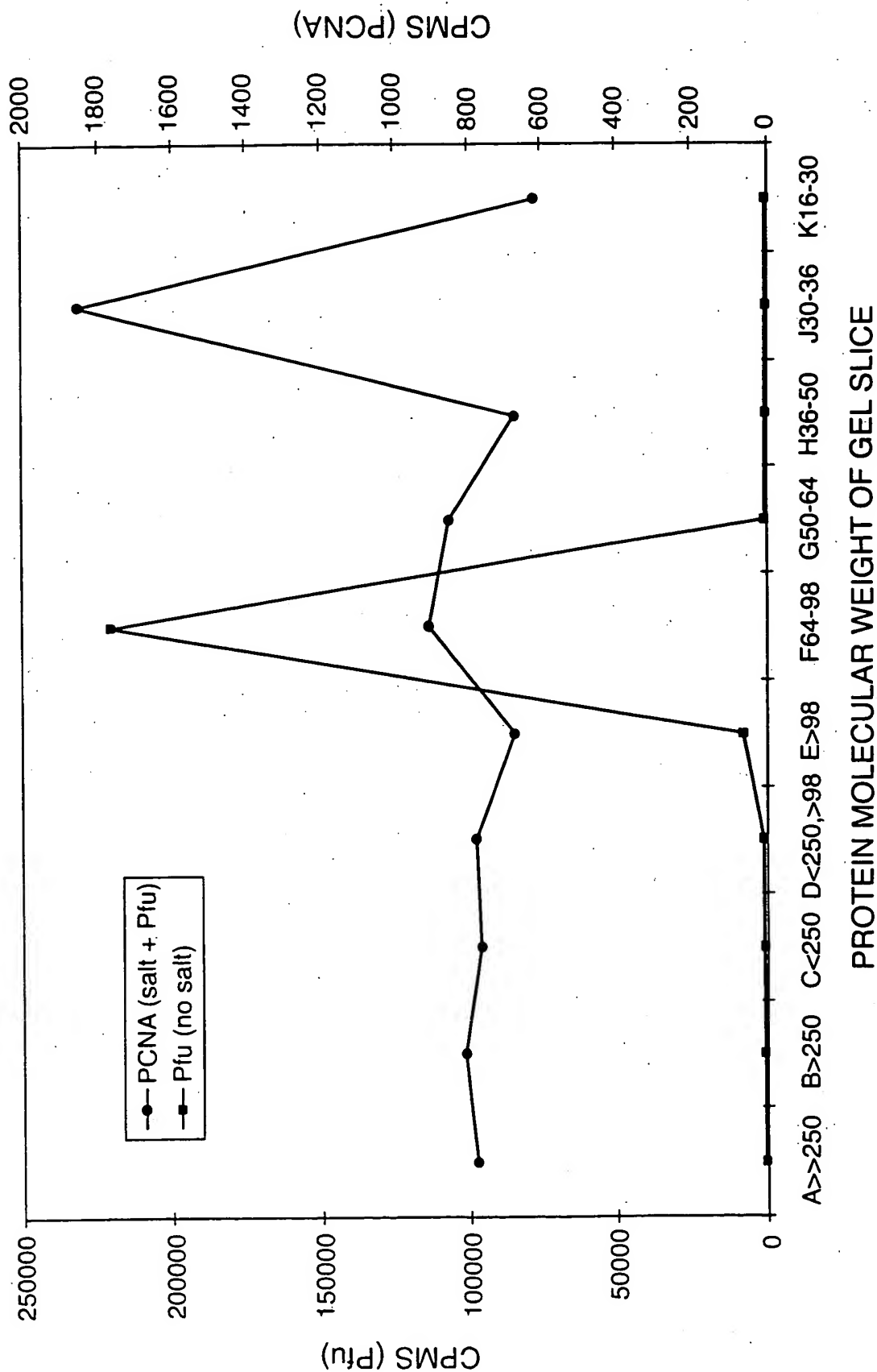
3 / 37

FIG. 3

```
ATGCCATTCGAAATAGTCTTTGAAGGTGCAAAAGAGTTTGCCCAACTTAT
AGACACCGCAAGTAAGTTAATAGATGAGGCCGCGTTTAAAGTTACAGAAG
ATGGGATAAGCATGAGGGCCATGGATCCAAGTAGAGTTGTCCTGATTGAC
CTAAATCTCCCGTCAAGCATATTTAGCAAATATGAAGTTGTTGAACCAGA
AACAATTGGAGTTAACATGGACCACCTAAAGAAGATCCTAAAGAGAGGTA
AAGCAAAGGACACCTTAATACTCAAGAAAGGAGAGGAAAACTTCTTAGAG
ATAACAATTCAAGGAACTGCAACAAGAACATTTAGAGTTCCCCTAATAGA
TGTAGAAGAGATGGAAGTTGACCTCCCAGAACTTCCATTCACTGCAAAGG
TTGTAGTTCTTGGAGAAGTCCTAAAAGATGCTGTTAAAGATGCCTCTCTA
GTGAGTGACAGCATAAAATTTATTGCCAGGGAAAATGAATTTATAATGAA
GGCAGAGGGAGAAACCCAGGAAGTTGAGATAAAGCTAACTCTTGAAGATG
AGGGATTATTGGACATCGAGGTTCAAGAGGAGACAAAGAGCGCATATGGA
GTCAGCTATCTCTCCGACATGGTTAAAGGACTTGGAAAGGCCGATGAAGT
TACAATAAAGTTTGGAAATGAAATGCCCATGCAAATGGAGTATTACATTA
GAGATGAAGGAAGACTTACATTCCTACTAGCCCCCAGGGTCGAGGAGTGA
```

FIG. 4

```
MPFEIVFEGAKEFAQLIDTASKLIDEAAFKVTEDGISMRAMDPSRVVLID
LNLPSSIFSKYEVVEPETIGVNMDHLKKILKRGKAKDTLILKKGEENFLE
ITIQGTATRTFRVPLIDVEEMEVDLPELPFTAKVVVLGEVLKDAVKDASL
VSDSIKFIARENEFIMKAEGETQEVEIKLTLEDEGLLDIEVQEETKSAYG
VSYLSDMVKGLGKADEVTIKFGNEMPMQMEYYIRDEGRLTFLLAPRVEE*
```

Title: Pfu REPLICATION ACCESSORY FACTORS AND METHODS OF
USE
Inventors: Holly H. Hogrefe et al.
Application No.: Not Yet Assigned
Filed: April 20, 2004
Attorney Docket No.: 04121.0161-02000
Page 4 of 37 (Figure 5)

4 / 37

CLAMP INCREASES PROCESSIVITY OF Pfu

FIG. 5

Title: Pfu REPLICATION ACCESSORY FACTORS AND METHODS OF
         USE
Inventors: Holly H. Hogrefe et al.
Application No.: Not Yet Assigned
Filed: April 20, 2004
Attorney Docket No.: 04121.0161-02000
Page 5 of 37 (Figures 6 and 7)

5U TPL + 1μl OF CLAMP DILUTION / 50μl PCR

FIG. 6

5U TPL + 1μl OF CLAMP DILUTION / 50μl PCR

FIG. 7

Title: Pfu REPLICATION ACCESSORY FACTORS AND METHODS OF USE
Inventors: Holly H. Hogrefe et al.
Application No.: Not Yet Assigned
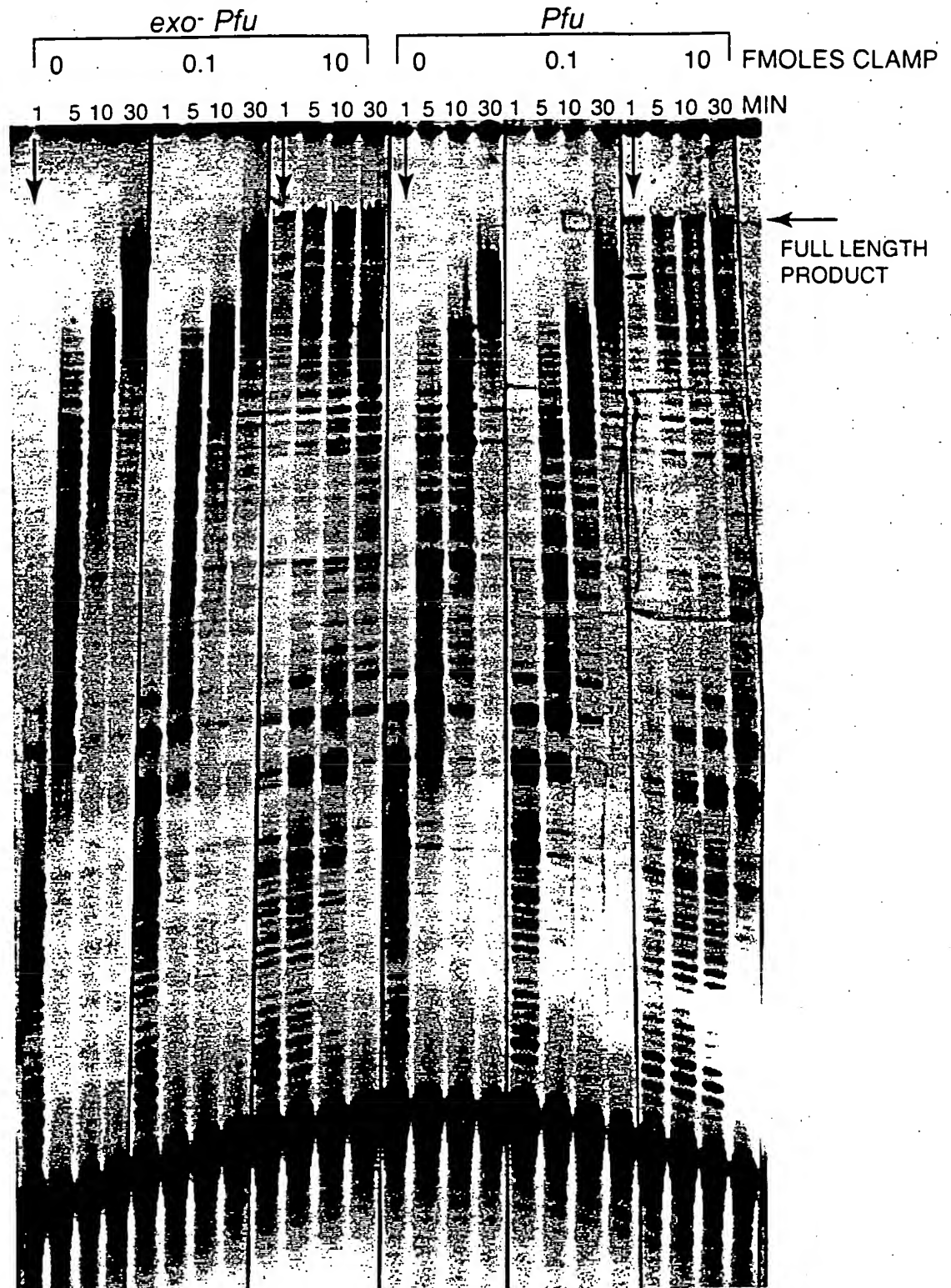Filed: April 20, 2004
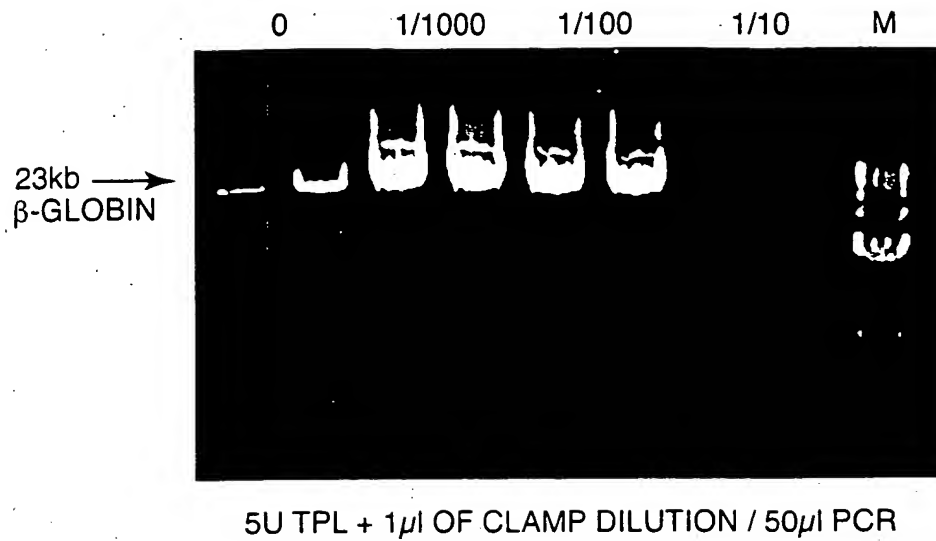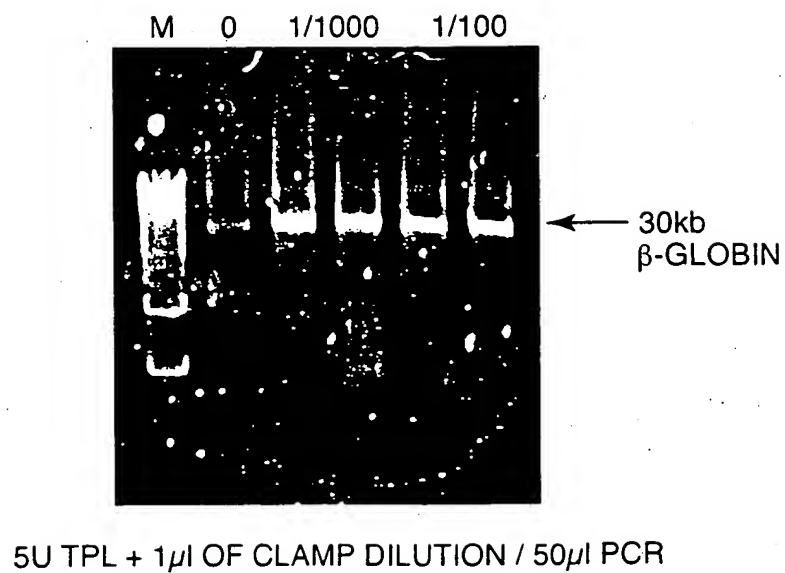Attorney Docket No.: 04121.0161-02000
Page 6 of 37 (Figure 8)

6 / 37

FIG. 8

```
ACCCAAAATTGTTATTCAGNTCAACGGAGAAGACGGAGTAGANTTGGAAGG
AGCTTATCCAGAGAAATGTTCTTAGAGAAGTTACTCTCAGCTCTCAGCTGA
TCTANNGTTTTTCCTTCTTTTCTTCTGTTCAGTTATNGCCTAGGATAAGCT
TAATAATACTTTGATACCTTTCTTAGTTTAGGTGTGTGAGAGTATGAGCGA
AGAGATTAGAGAAGTTAAGGTTCTAGAAAAACCCTGGGTTGAGAAGTATAG
ACCTCAAAGACTTGACGACATTGTAGGACAAGAGCACATAGTGAAAAGGCT
CAAGCACTACGTCAAAACTGGATCAATGCCCCACCTACTCTTCGCAGGCCC
CCCTGGTGTCGGAAAGTGTCTTACTGGAGATACCAAAGTTATAGCTAATGG
CCAACTCTTTGAACTTGGAGAACTTGTTGAAAGCTTTCTGGGGGGAGATT
TGGACCAACTCCAGTTAAAGGGCTCAAAGTTCTTGGAATAGATGAGGATGG
AAAGCTTAGAGAGTTTGAAGTCCAATACGTCTACAAAGATAGAACTGATAG
GTTGATAAAGATAAAAACTCAGCTTGGCAGGGAGCTTAAAGTAACTCCGTA
TCACCCACTTCTAGTGATTGGAGAGAATGGCGAATTAAAGTGGATTAAGGC
TGAAGAACTCAAACTTGGCGACAAGCTTGCAATACCGAGCTTTCTCCCACT
TATAACTGGAGAAATCCCCTTGCAGAGTGGCTTGGTTACTTTATGGGAAG
TGGCTATGCTTATCCCAAGAATTCTGTCATCACGTTCACTAACGAAGATCC
ACTCATAAGACAACGCTTTATGGAACTAACAGAGAAACTTTTCCCTGATGC
AAAGATAAGGGAAAGAATTCACGCTGATGGAACTCCAGAAGTTTATGTGGT
ATCTAGGAAAGCTTGGAGCCTTGTAAACTCTATTAGCTTAACATTAATACC
CAGGGAGGGGTGGAAAGGAATTCGTTCTTTCCTTAGGGCATATTCCGACTG
CAATGGTCGGATTGAAAGTGATGCAATAGTTTTATCAACCGATAACAATGA
TATGGCCCAGCAGATAGCCTATGCTTTAGCCAGCTTTGGAATAATAGCTAA
AATGGATGGAGAAGATGTTATTATCTCAGGCTCGGACAACATAGAGAGGTT
CCTAAATGAGATTGGCTTTAGCACCCAAAGCAAACTTAAAGAAGCCCAGAA
GCTCATTAGAAAAACCAATGTAAGATCCGATGGACTAAAGATTAACTATGA
GCTAATCTCCTATGTAAAAGACAGGCTTAGGTTAAATGTCAATGATAAAAG
AAATTTGAGCTACAGAAATGCAAAGGAGCTTTCTTGGGAACTCATGAAAGA
AATTTATTATCGCCTTGAGGAACTGGAGAGACTAAAGAAGGTCTTATCAGA
ACCCATCTTGATCGACTGGAATGAAGTAGCAAAGAAGAGTGATGAAGTAAT
AGAAAAAGCTAAAATTAGAGCAGAGAAGCTCCTAGAATACATAAAAGGAGA
GAGAAAGCCAAGTTTCAAGGAGTACATTGAGATAGCAAAAGTCCTTGGAAT
TAACGTTGAACGTACCATCGAAGCTATGAAGATCTTTGCAAAGAGATACTC
AAGCTATGCCGAGATTGGAAGAAAACTTGGAACTTGGAATTTCAATGTAAA
AACAATTCTTGAGAGCGACACAGTGGATAACGTTGAAATCCTTGAAAAGAT
AAGGAAAATTGAGCTTGAGCTCATAGAGGAAATTCTTTCGGATGGAAAGCT
CAAAGAAGGTATAGCATATCTCATTTTCCTCTTCCAGAATGAGCTTTACTG
GGACGAGATAACTGAAGTAAAGAGCTTAGGGGAGACTTTATAATCTATGA
TCTTCATGTTCCTGGCTACCACAACTTTATTGCTGGGAACATGCCAACAGT
AGTCCATAACACTACAGCGGCTTTGGCCCTTGCAAGAGAGCTTTTCGGCGA
AAACTGGAGGCATAACTTCCTCGAGTTGAATGCTTCAGATGAAAGAGGTAT
AAACGTAATTAGAGAGAAAGTTAAGGAGTTTGCGAGAACAAAGCCTATAGG
AGGAGCAAGCTTCAAGATAATTTTCCTTGATGAGGCCGACGCTTTAACTCA
AGATGCCCAACAAGCCTTAAGAAGAACCATGGAAATGTTCTCGAGTAACGT
TCGCTTTATCTTGAGCTGTAACTACTCCTCCAAGATAATTGAACCCATACA
GTCTAGATGTGCAATATTCCGCTTCAGACCTCTCCGCGATGAGGATATAGC
GAAGAGACTAAGGTACATTGCCGAAAATGAGGGCTTAGAGCTAACTGAAGA
AGGTCTCCAAGCAATACTTTACATAGCAGAAGGAGATATGAGAAGAGCAAT
AAACATTCTGCAAGCTGCAGCAGCTCTAGACAAGAAGATCACCGACGAAAA
(cont.)
```

Title: Pfu REPLICATION ACCESSORY FACTORS AND METHODS OF USE
Inventors: Holly H. Hogrefe et al.
Application No.: Not Yet Assigned
Filed: April 20, 2004
Attorney Docket No.: 04121.0161-02000
Page 7 of 37 (Figure 8 (cont.))

7 / 37

FIG. 8 (cont.)

CGTATTCATGGTAGCGAGTAGAGCTAGACCTGAAGATATAAGAGAGATGAT
GCTTCTTGCTCTCAAAGGCAACTTCTTGAAGGCCAGAGAAAAGCTTAGGGA
GATACTTCTCAAGCAAGGACTTAGTGGAGAAGATGTACTAGTTCAGATGCA
CAAAGAAGTCTTCAACCTGCCAATAGAGGAGCCAAAGAAGGTTCTGCTTGC
TGATAAGATAGGAGAGTATAACTTCAGACTCGTTGAAGGGGCTAATGAAAT
AATTCAGCTTGAAGCACTCTTAGCACAGTTCACCCTAATTGGGAAGAAGTG
ATGAAGTATGCCAGAGCTTCCCTGGGTAGAAAAATACAGGCCAAAAAGTT
AAGTGAAATTGTAAACCAAGAAGAGGCTATAGAGAAGTTAGAGCGTGGAT
AGAGAGCTGGTTGCATGGCCACCCCCCTAAGAAAAAGCCCTATTATTAGC
AGGACCCCCAGGGAGCGGAAAGACAACCACAGTCTACGCTCTAGCAAATGA
GTACAACTTTGAAGTCATTGAGCTCAACGCGAGTGATGAGAGAACTTATGA
AAAAATCTCCAGGTATGTTCAAGCAGCATACACTATGGATATCCTCGGAAA
GAGGAGGAAGATAATCTTCCTCGATGAAGCAGATAATATAGAGCCCAGCGG
AGCTAAGGAAATCGCAAAACTAATTGATAAGGCCAAAAATCCAATAATAAT
GGCTGCAAATAAGTACTGGGAAGTTCCAAAAGAGATCCGAGAAAAAGCTGA
GCTAGTAGAGTACAAGAGGTTAACCCAGAGAGATGTAATGAATGCCTTAAT
AAGGATCCTAAAGAGGGAAGGTATAACAGTTCCAAAAGAAATCCTCCTAGA
AATAGCAAAAAGATCTAGTGGAGATCTAAGAGCAGCTATAAATGATCTACA
GACCGTTGTAGTGGGTGGTTACGAAGATGCTACGCAAGTTTTGGCATATAG
AGATGTAGAAAAGACAGTCTTTCAAGCCCTAGGACTCGTCTTTGGAAGTGA
CAACGCCAAGAGGGCAAAGATGGCAATGTGGAACTTGGACATGTCCCCTGA
TGAATTCCTGCTATGGGTAGATGAGAACATTCCTCACCTCTACCTAAATCC
AGAGGAGATTGCCCAGGCGTATGATGCAATTAGTAGAGCCGACATATACCT
CGGAAGGGCCGCCAGAACTGGAAACTATTCACTCTGGAAGTACGCAATAGA
TATGATGACTGCAGGAGTTGCCGTGGCAGGGAGAAAGAGAAGGGGATTTGT
CAAGTTTTATCCTCCCAACACCCTAAAGATTTTAGCGGAAAGCAAAGAAGA
AAGAGAGATCAGAGAGTCCATAATTAAAAAGATAATACGAGAGATGCNCAT
GAGTAGGCTACAGGCAATAGAAACGATGAAAATAATTAGAGAGATTTTCGA
GAACAATCTAGACCTTGCTGCGCACTTTACAGTGTTCCTTGGTCTGTCTGA
AAAAGAAGTTGAGTTTCTAGCTGGAAAGGAAAAAGCTGGTACCATTTGGGG
CAAAGCCTTAGCATTAAGAAGGAAACTTAAGGAGCTTGGAATAAGAGAGGA
GGAGAAGCCTAAAGTTGAAATTGAAGAAGAGGAAGAAGAGGAAGAAAAGAC
CGAAGAAGAAAAAGAGGAAATAGAAGAAAAACCCGAAGAAGAGAAAGAAGA
GGAGAAGAAAGAAAAGGAAAGCcaaAGAAAGGCAAACAAGCAACTCTCTT
TGACTTTCTTAAAAAGTGATTACCCTTTTTCTTCTATTAGAGCTCCGAATA
AAGTTGGCCCTCTAATTTTTTCTATTGTCTCCTCCACATTAATCTTTACGA
ATTGGAATTCCTGCAGCCCGGGGGATCCACTAGTTCTAGAGCGGCCGCCAC
CGCGGTGGAGCTCCAGCTTTTGTTCCCTTTAGTGAGGGTTAATTTCGAGCT
TGGCGTAATCATGGTCATAGCTGTTTCCTGTGTGAAATTGTTATCCGCTCA
CAATTCCACACAACATACGAACCCGGAAGCATAAATTGTAAACCCNGGGGT
GCCTAATGANTGANCTAACTCACATTAATTGCNTTGCGCTCACTGCCCGCT
TTCCANTCGGGAAACCTGTCGTGCCAGCTGCATTAATGAATCGGCCAACNC
GCGGGGANAAGCGGTTGCGTATTGGGCGCTCTTCCGCTTCCTCGCTCATGA
CTCGCTGCGCTCGGTCNTCGGCTGCGGCGAACGGTATCAGCTCATCAAAGG
CGGTAATACGGTTATCCNCAAATCAGGGGATAACGCAGGAAAAACTTTNN
ACAAAAGGCNNCAAAAGGCGGAAACTAAAAGGCGCNTTCTGGGTTTTTCNT
AGGCCCNCCCCGANAACTCNAAAAATCAACNCATTCAAGTGGGAAACCAAA
GAA

Title: Pfu REPLICATION ACCESSORY FACTORS AND METHODS OF USE
Inventors: Holly H. Hogrefe et al.
Application No.: Not Yet Assigned
Filed: April 20, 2004
Attorney Docket No.: 04121.0161-02000
Page 8 of 37 (Figure 9)

8 / 37

FIG. 9

```
PKIVIQXNGEDGVXLEGAYPEKCS*RSYSQLSADLXFFLLFFCSVXA*DK
LNNTLIPFLV*VCES(MSEEIREVKVLEKPWVEKYRPQRLDDIVGQEHIV
KRLKHYVKTGSMPHLLFAGPPGVGK[CLTGDTKVIANGQLFELGELVEKL
SGGRFGPTPVKGLKVLGIDEDGKLREFEVQYVYKDRTDRLIKIKTQLGRE
LKVTPYHPLLVIGENGELKWIKAEELKLGDKLAIPSFLPLITGENPLAEW
LGYFMGSGYAYPKNSVITFTNEDPLIRQRFMELTEKLFPDAKIRERIHAD
GTPEVYVVSRKAWSLVNSISLTLIPREGWKGIRSFLRAYSDCNGRIESDA
IVLSTDNNDMAQQIAYALASFGIIAKMDGEDVIISGSDNIERFLNEIGFS
TQSKLKEAQKLIRKTNVRSDGLKINYELISYVKDRLRLNVNDKRNLSYRN
AKELSWELMKEIYYRLEELERLKKVLSEPILIDWNEVAKKSDEVIEKAKI
RAEKLLEYIKGERKPSFKEYIEIAKVLGINVERTIEAMKIFAKRYSSYAE
IGRKLGTWNFNVKTILESDTVDNVEILEKIRKIELELIEEILSDGKLKEG
IAYLIFLFQNELYWDEITEVKELRGDFIIYDLHVPGYHNFIAGNMPTVVH
N]TTAALALARELFGENWRHNFLELNASDERGINVIREKVKEFARTKPIG
GASFKIIFLDEADALTQDAQQALRRTMEMFSSNVRFILSCNYSSKIIEPI
QSRCAIFRFRPLRDEDIAKRLRYIAENEGLELTEEGLQAILYIAEGDMRR
AINILQAAAALDKKITDENVFMVASRARPEDIREMMLLALKGNFLKAREK
LREILLKQGLSGEDVLVQMHKEVFNLPIEEPKKVLLADKIGEYNFRLVEG
ANEIIQLEALLAQFTLIGKK)**S(MPELPWVEKYRPKKLSEIVNQEEAI
EKVRAWIESWLHGHPPKKKALLLAGPPGSGKTTTVYALANEYNFEVIELN
ASDERTYEKISRYVQAAYTMDILGKRRKIIFLDEADNIEPSGAKEIAKLI
DKAKNPIIMAANKYWEVPKEIREKAELVEYKRLTQRDVMNALIRILKREG
ITVPKEILLEIAKRSSGDLRAAINDLQTVVVGGYEDATQVLAYRDVEKTV
FQALGLVFGSDNAKRAKMAMWNLDMSPDEFLLWVDENIPHLYLNPEEIAQ
AYDAISRADIYLGRAARTGNYSLWKYAIDMMTAGVAVAGRKRRGFVKFYP
PNTLKILAESKEEREIRESIIKKIIREMXMSRLQAIETMKIIREIFENNL
DLAAHFTVFLGLSEKEVEFLAGKEKAGTIWGKALALRRKLKELGIREEEK
PKVEIEEEEEEEKTEEEKEEIEEKPEEEKEEEKKEKEKPKKGKQATLFD
FLKK)*LPFFFY*SSE*SWPSNFFYCLLHINLYELEFLQPGGSTSSRAAA
TAVELQLLFPLVRVNFELGVIMVIAVSCVKLLSAHNSTQHTNPEA*IVNP
GVPNX*XNSH*LXCAHCPLSXRETCRASCINESANXRGXAVAYWALFRFL
AHDSLRSVXGCGERYQLIKGGNTVIXKSGDNAGKNFXQKAXKGGN*KAXS
GFFXGPPRXLXKSTHSSGKPK
```

Title: Pfu REPLICATION ACCESSORY FACTORS AND METHODS OF USE
Inventors: Holly H. Hogrefe et al.
Application No.: Not Yet Assigned
Filed: April 20, 2004
Attorney Docket No.: 04121.0161-02000
Page 9 of 37 (Figures 10 and 11)

9 / 37

FIG. 10

MPELPWVEKYRPKKLSEIVNQEEAIEKVRAWIESWLHGHPPKKKALLLAG
PPGSGKTTTVYALANEYNFEVIELNASDERTYEKISRYVQAAYTMDILGK
RRKIIFLDEADNIEPSGAKEIAKLIDKAKNPIIMAANKYWEVPKEIREKA
ELVEYKRLTQRDVMNALIRILKREGITVPKEILLEIAKRSSGDLRAAIND
LQTVVVGGYEDATQVLAYRDVEKTVFQALGLVFGSDNAKRAKMAMWNLDM
SPDEFLLWVDENIPHLYLNPEEIAQAYDAISRADIYLGRAARTGNYSLWK
YAIDMMTAGVAVAGRKRRGFVKFYPPNTLKILAESKEEREIRESIIKKII
REMXMSRLQAIETMKIIREIFENNLDLAAHFTVFLGLSEKEVEFLAGKEK
AGTIWGKALALRRKLKELGIREEEKPKVEIEEEEEEEKTEEEKEEIEEK
PEEEKEEEKKEKEKPKKGKQATLFDFLKK*

FIG. 11

MSEEIREVKVLEKPWVEKYRPQRLDDIVGQEHIVKRLKHYVKTGSMPHLLF
AGPPGVGKTTAALALARELFGENWRHNFLELNASDERGINVIREKVKEFAR
TKPIGGASFKIIFLDEADALTQDAQQALRRTMEMFSSNVRFILSCNYSSKI
IEPIQSRCAIFRFRPLRDEDIAKRLRYIAENEGLELTEEGLQAILYIAEGD
MRRAINILQAAAALDKKITDENVFMVASRARPEDIREMMLLALKGNFLKAR
EKLREILLKQGLSGEDVLVQMHKEVFNLPIEEPKKVLLADKIGEYNFRLVE
GANEIIQLEALLAQFTLIGKK**

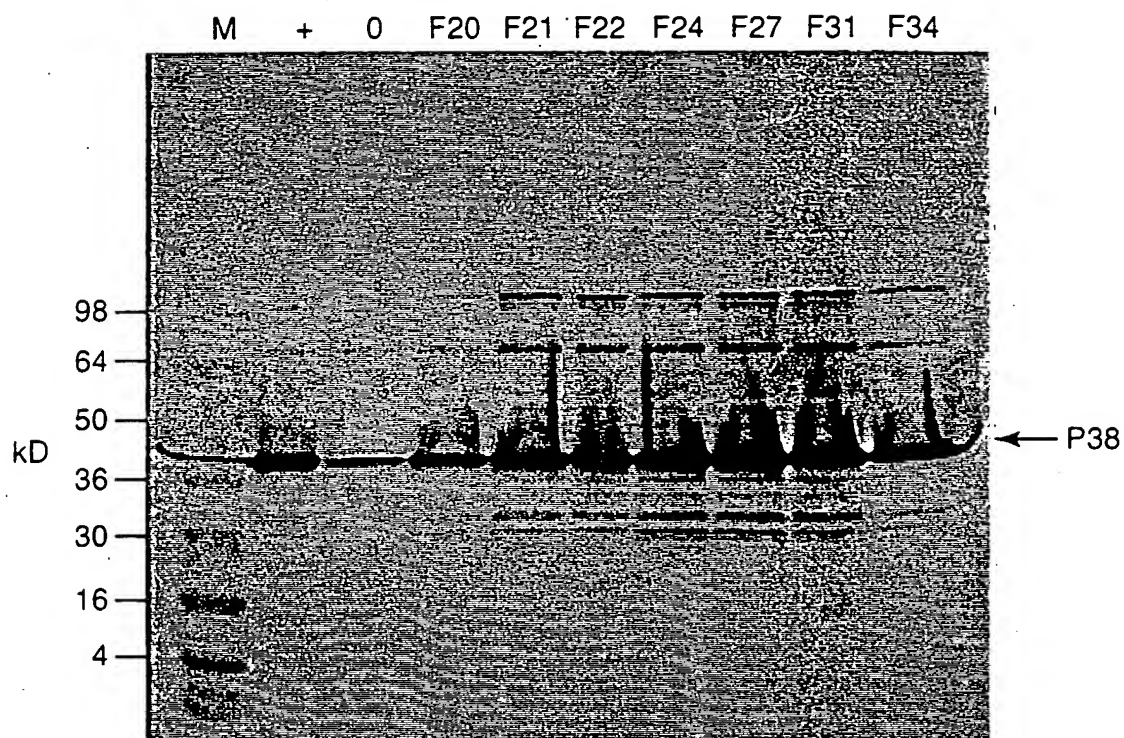Title: Pfu REPLICATION ACCESSORY FACTORS AND METHODS OF
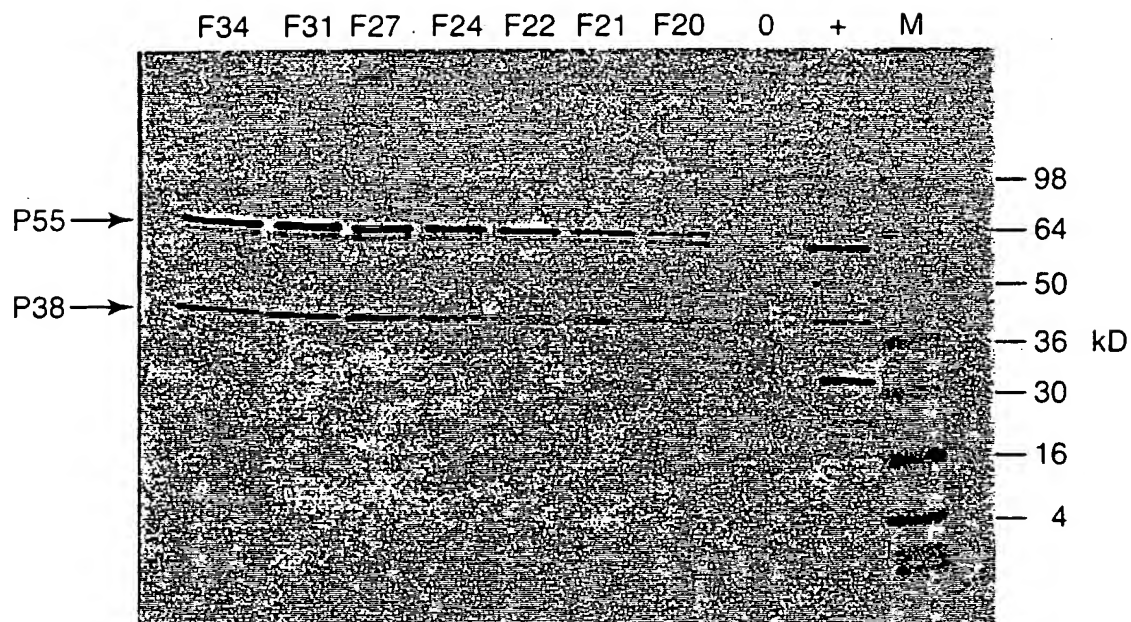   USE
Inventors: Holly H. Hogrefe et al.
Application No.: Not Yet Assigned
Filed: April 20, 2004
Attorney Docket No.: 04121.0161-02000
Page 10 of 37 (Figures 12A and 12B)

10 / 37

FIG. 12A

FIG. 12B

Title: Pfu REPLICATION ACCESSORY FACTORS AND METHODS OF
USE
Inventors: Holly H. Hogrefe et al.
Application No.: Not Yet Assigned
Filed: April 20, 2004
Attorney Docket No.: 04121.0161-02000
Page 11 of 37 (Figure 13 and 15)

11 / 37

WASHES   pH 2.8 ELUATES

M   +   αP38 αP55 F18 F19 F20 F21 F22 F23
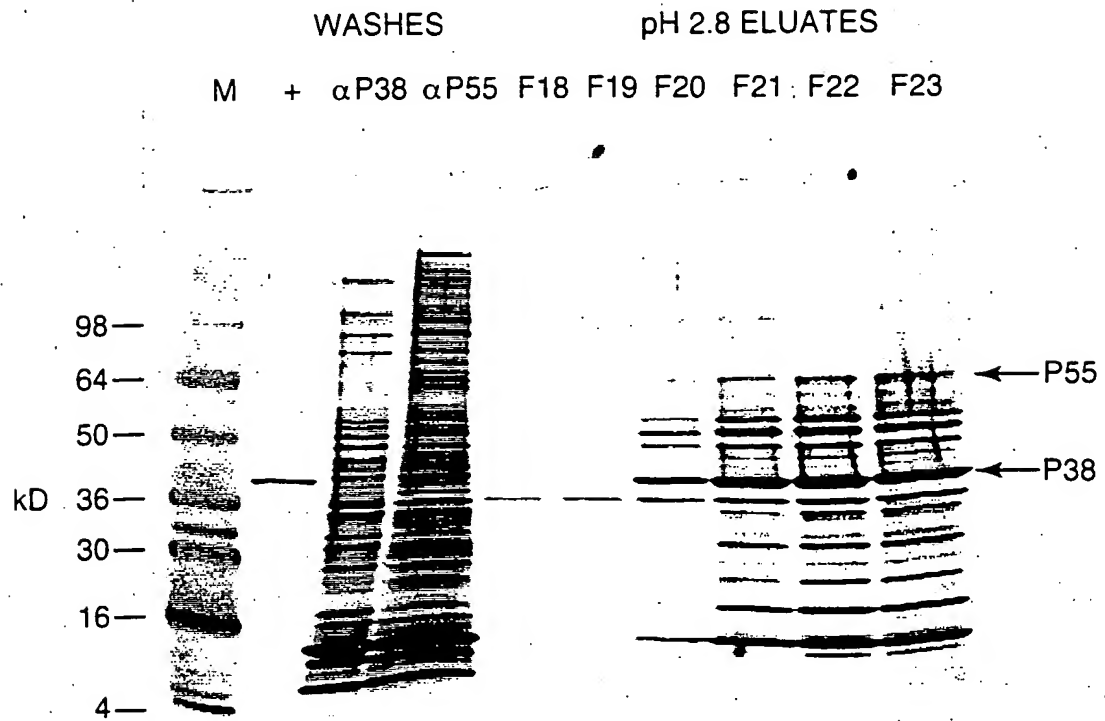
FIG. 13

NATIVE CLAMP LOADER STIMULATION OF
cPfu/CLAMP PRIMER EXTENSION ON M13

1 2 3 4 5 6

←——— FULL LENGTH M13
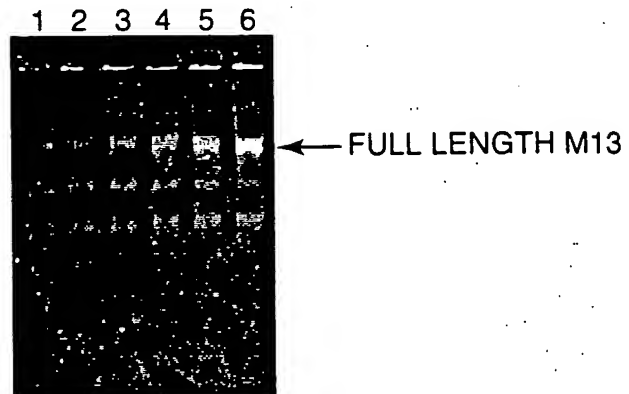
VOLUME OF NATIVE CLAMP LOADER
1. 0
2. 0.01ul
3. 0.1ul
4. 0.5ul
5. 1ul
6. 2ul

FIG. 15

Title: Pfu REPLICATION ACCESSORY FACTORS AND METHODS OF USE
Inventors: Holly H. Hogrefe et al.
Application No.: Not Yet Assigned
Filed: April 20, 2004
Attorney Docket No.: 04121.0161-02000
Page 12 of 37 (Figure 14)

12 / 37

FIG. 14

Title: Pfu REPLICATION ACCESSORY FACTORS AND METHODS OF
         USE
Inventors: Holly H. Hogrefe et al.
Application No.: Not Yet Assigned
Filed: April 20, 2004
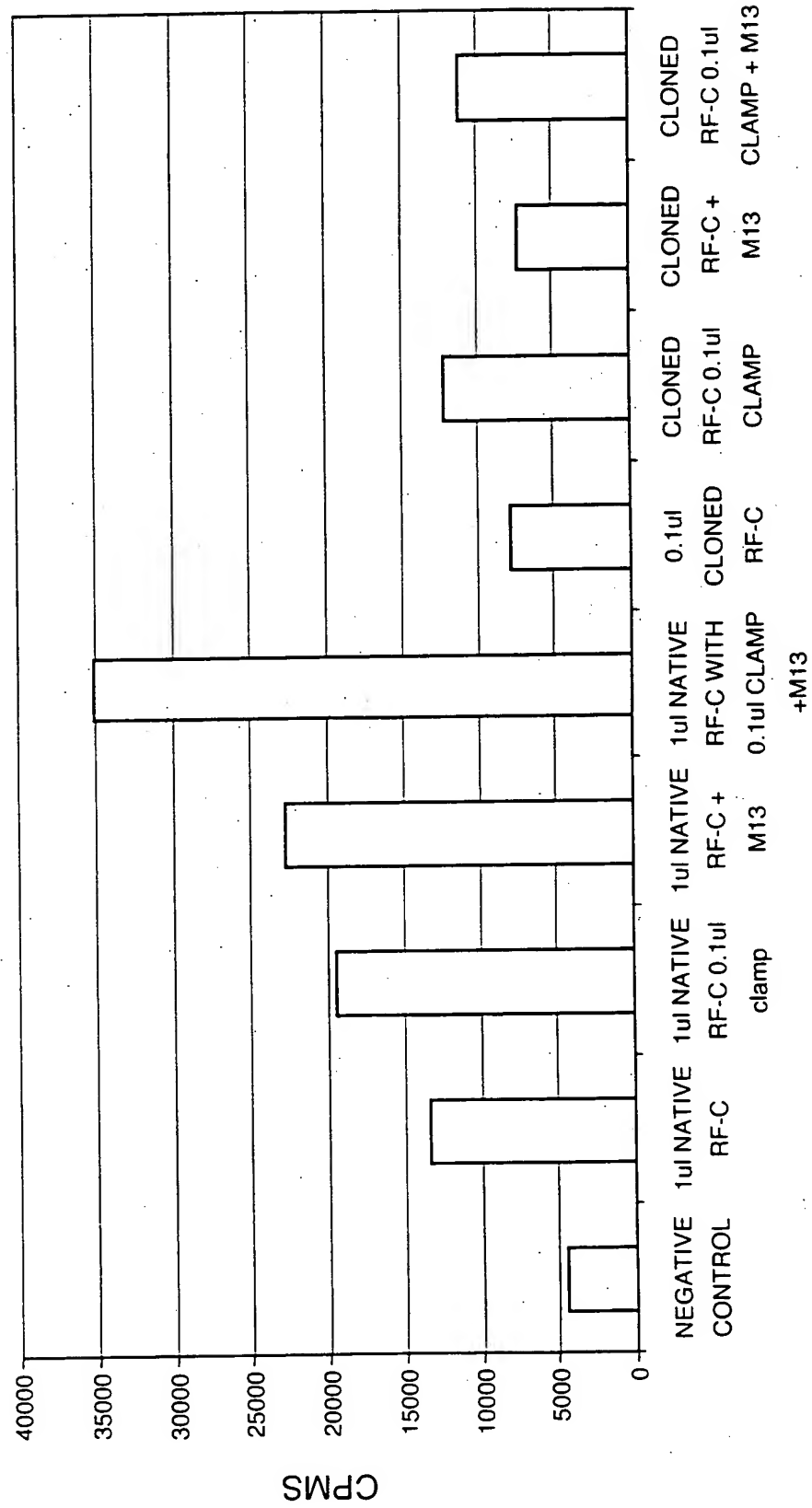Attorney Docket No.: 04121.0161-02000
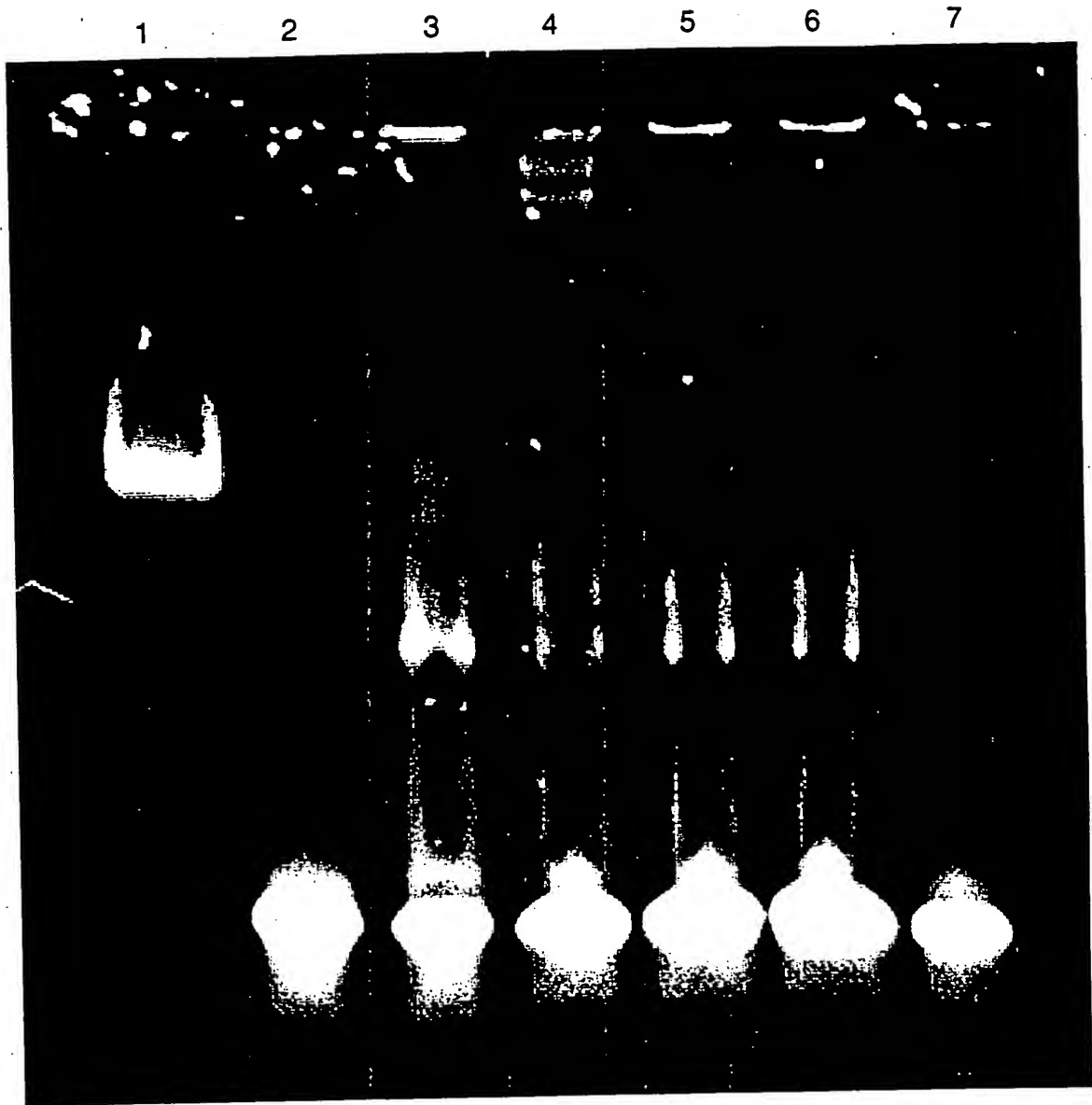Page 13 of 37 (Figures 16 and 17)

13 / 37

FIG. 16

```
ATGAGT7GCATTTACAAAAGAAGAAATAATCAAGAGGATCCTGGAAGAAG
TGGAAGGAATAACTCTAGAAGAAATTGAGAACCAAATAAGGCAAATAATG
AGGGAAAACAATATTTCAGAGCATGCAGCTGCTCTCTTACTAGCAGAAAG
GCTGGGAGTTGAAGTTACCAAAAGAGAAGAACAACCTTTAATGAAGATTA
GCGACCTATATCCAGGAATGGATCCCCACGAGGTCAACATTGTTGGAAGA
ATACTTAAGAAGTATCCACCGCGAGAATACACAAAGAAGGATGGAAGCAT
TGGAAGGGTTGCCAGTCTAGTTATATCGATGATACTGGGAGAGCGAGGG
TTGTTCTTTGGGATTCAAAAGTTTTGGAGTATTACAGCAAGCTAGAAGTA
GGGGATGTTATTAAGGTTTTAGACGCCCAGGTTAGGGAGAGCTTATCTGG
TTTGCCTGAATTGCACATTAACTTCAGGGCTAGAATAATTAAAAACCCAG
ATGATCCTAGGGTTCAGGATATCCCACCTCTTGAAGAAGTTAGAGTGGCA
ACTTATACGAGAAAGAAGATCAGTGAGGTCGAGCCTGGGGATAGATTTGT
AGAGCTTAGGGGAACAATTGCCAAAGTTTACAGAGTTTTGGTATATGATG
CATGTCCAGAGTGTAAGAAGAAGGTTGACTATGACCCAGGAATGGACGTT
TGGATATGTCCAGAACATGGAGAGGTTGAGCCAATAAAAATCACTATTCT
TGACTTTGGGCTTGATGATGGCTCGGGATACATTAGGATTACCCTCTTTG
GAGACGATGCTGAAGAGTTGCTGGGAGTAGGGCCAGAAGAGATTGCCCAA
AAGCTTAAGGAAATGGAGAGCATGGGCATGACTCTCAAGGAGGCAGCGAG
AAAATTGGCGGAGGAAGAGTTCTACAATATAATAGGGAAAGAAATAATCG
TGAGGGGAAATGTAATTGAGGACAGGTTCTTGGGCCTAATCTTAAGGGCC
TCCTCCTGGGAAGAAGTTGACTACAAGAGAGAAATTGAGAGAATTAAGAG
GGAATTGGAAGAATTGGGGGTGATGTGA
```

FIG. 17

```
MI3MSAFTKEEIIKRILEEVEGITLEEIENQIRQIMRENNISEHAAALLLA
ERLGVEVTKREEQPLMKISDLYPGMDPHEVNIVGRILKKYPPREYTKKDG
SIGRVASLVIYDDTGRARVVLWDSKVLEYYSKLEVGDVIKVLDAQVRESL
SGLPELHINFRARIIKNPDDPRVQDIPPLEEVRVATYTRKKISEVEPGDR
FVELRGTIAKVYRVLVYDACPECKKKVDYDPGMDVWICPEHGEVEPIKIT
ILDFGLDDGSGYIRITLFGDDAEELLGVGPEEIAQKLKEMESMGMTLKEA
ARKLAEEEFYNIIGKEIIVRGNVIEDRFLGLILRASSWEEVDYKREIERI
KRELEELGVM
```

Title: Pfu REPLICATION ACCESSORY FACTORS AND METHODS OF
         USE
Inventors: Holly H. Hogrefe et al.
Application No.: Not Yet Assigned
Filed: April 20, 2004
Attorney Docket No.: 04121.0161-02000
Page 14 of 37 (Figure 18)

14 / 37

RFA GEL SHIFT

FIG. 18

Title: Pfu REPLICATION ACCESSORY FACTORS AND METHODS OF
           USE
Inventors: Holly H. Hogrefe et al.
Application No.: Not Yet Assigned
Filed: April 20, 2004
Attorney Docket No.: 04121.0161-02000
Page 15 of 37 (Figures 19 and 20)

Pfu TURBO WITH RFA

RFA/50 μl PCR RXN

1. 0
2. 1μl
3. 1μl 1/10
4. 1μl 1/100

FIG. 19

Pfu TURBO WITH RFA

RFA/50 μl PCR RXN

1. 0 λ
2. 1 λ
3. 1 λ of 1/10
4. 1 λ of 1/100

FIG. 20

Title: Pfu REPLICATION ACCESSORY FACTORS AND METHODS OF USE
Inventors: Holly H. Hogrefe et al.
Application No.: Not Yet Assigned
Filed: April 20, 2004
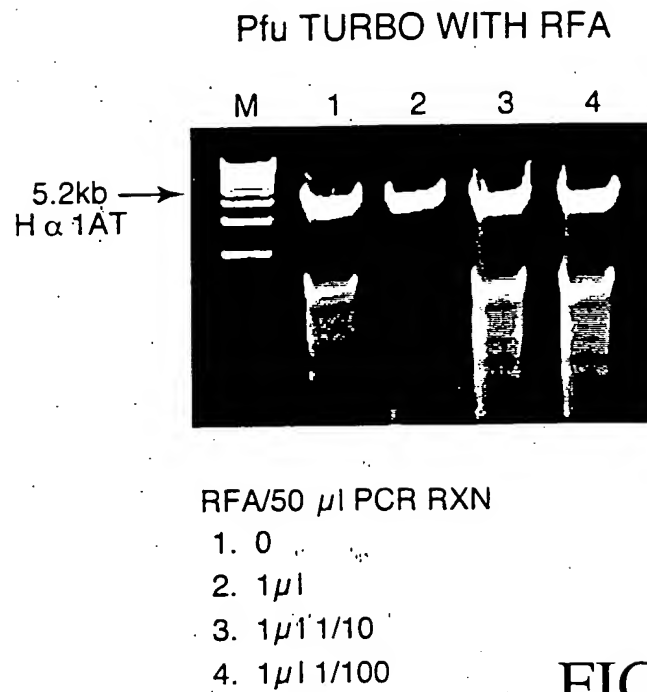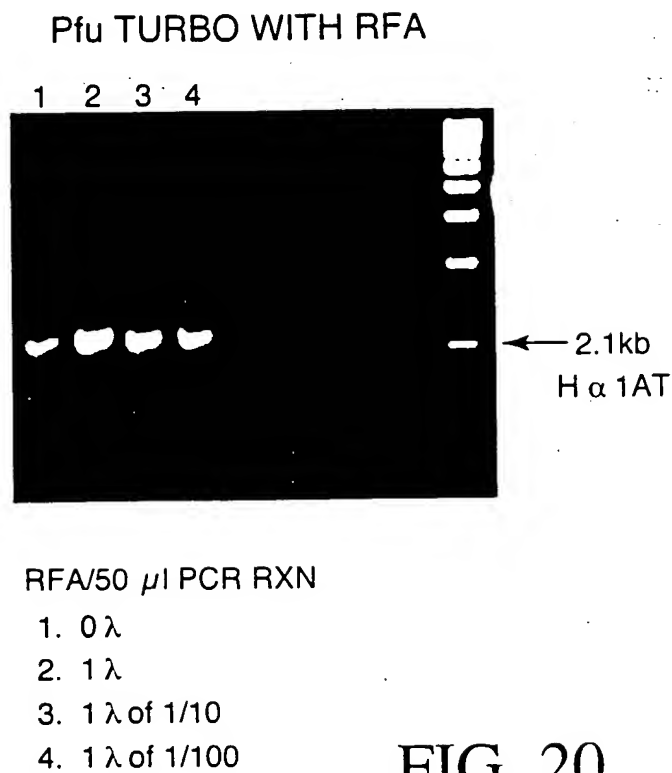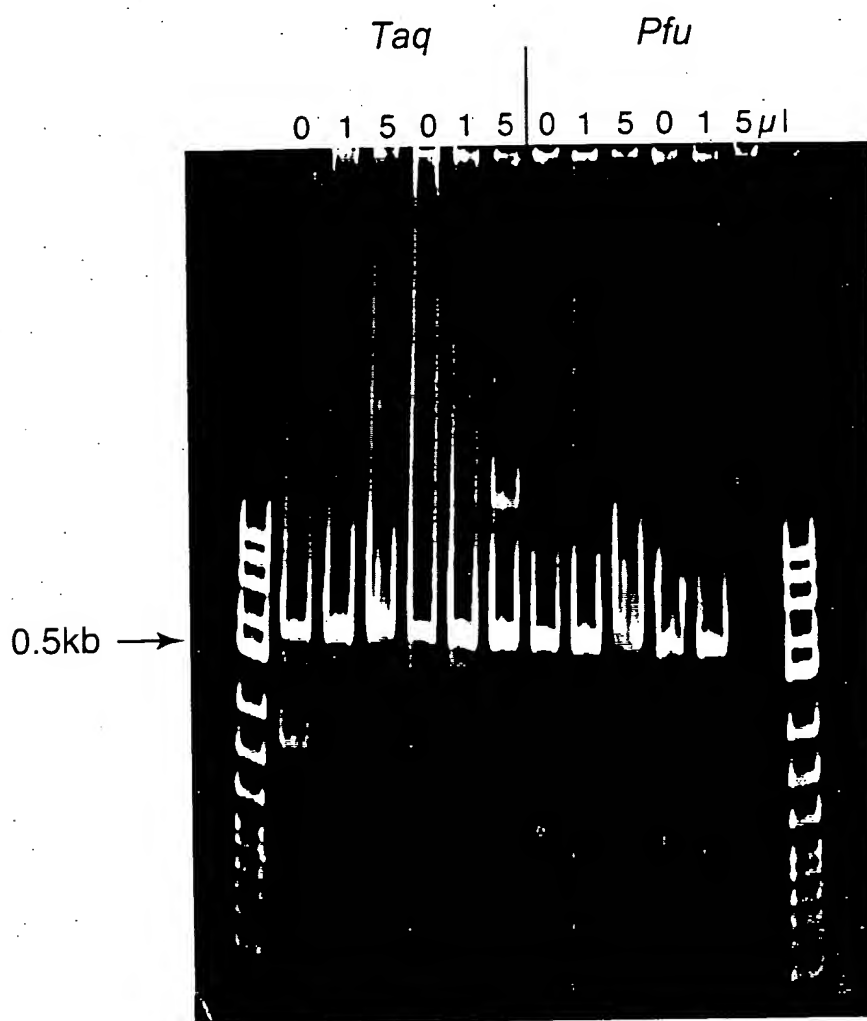Attorney Docket No.: 04121.0161-02000
Page 16 of 37 (Figure 21)

16 / 37

EFFECT OF RFA AND E. COLI SSB (PERFECT MATCH)
ON PCRs USING Taq AND Pfu DNA POLYMERASES

RFA = P. FURIOSUS RFA
PM = STRATAGENE'S E. COLI SSB

FIG. 21

Title: Pfu REPLICATION ACCESSORY FACTORS AND METHODS OF USE
Inventors: Holly H. Hogrefe et al.
Application No.: Not Yet Assigned
Filed: April 20, 2004
Attorney Docket No.: 04121.0161-02000
Page 17 of 37 (Figure 22)

17 / 37

FIG. 22

```
ATGATTGAGGAGCTGTTCAAGGGATTAGAGAGTGAAATCGTTGGACTTCA
CGAGATTCCCCCAAAGAGGGGAGAGTATGGGGAGTTCAAATTCAGGAATG
AAGAAGTTAATGAGTTAGTTAAGAGGCTCGGATTTAGACTTTATTCTCAC
CAAGTTAAAGCCCTAGAAAAGCTGTATTCAGGGAAAAACGTAGTTGTTTC
AACGCCCACAGCTAGTGGGAAAAGCGAGATATTTAGGTTGTTTATCTTTG
ACGAAATACTGTCAAGCCCGTCCTCAACTTTTCTCTTAATCTACCCAACA
AGAGCCTTAATAAACAACCAAATGGAAAAATTCGAAAAGAAAACACTAT
CTTTGAGGAGATTTGTGGAAAAGAGTTCGAGCAGAAGTCTTAACTGGAG
ATACGGAATGGGAAAAGAGAAGAGAAATCATTAGGAGCAAACCAAACGTA
ATCTTCACGACACCCGATATGCTTCATCATCACATTCTTCCCAGGTGGAG
GGATTATTTCTGGCTTTTAAAGGGGCTTAGACTTCTTGTCGTGGACGAAT
TGCACGTTTATAGGGGGATCTTTGGAACAAATGTTGCTTATGTTTTCAAG
AGACTCTTTCTCAGGCTTAAGAGATTAAGTTCAAGCCCCCAAATACTTGC
CCTTTCAGCAACTTTGAGAAACCCCAAAGAATTTGCTGAACAATTTTTTG
AGACTGAATTTGAGGAGGTCAAGGAAGCTGGAAGTCCAAGCCCGAGAAGA
ATTATAGTCATGTTTGAGCCAAGAAGGTTTACTGGAGAACAACTAATCAA
GCAAATTGTTGAGAGACTAACTAGAAAGAACATAAAGACCTTGGTATTTT
TTGACTCCAGAAAGGGGACAGAAAGAATCATGAGGCTTTTCCTGTTCTCA
GATGCTTTTGATAGGATCACAACATACAAAGGGACGCTAACTAAGAGGGA
AAGGTTTCTAATAGAGAGAGACTTTAGGGAGGGCAACCTCACAGTTCTCC
TAACGACAAATGCACTCGAGTTGGGAATTGACATTGGAGATTTAGATGCA
GTAATAAACTATGGGATTCCTTCAGATGGATTGTTTTCACTAATTCAAAG
ATTTGGTAGGGCCGGAAGGGATCCAAATAGAATTGCAATAAACGGGATAA
TTTTGAGAAGAAATGGATTGGACTACTATTACAAGAACATTTCGATGAG
CTCGTTGAGGGAATAGAAAAGGGCCTAGTGGAGAAAATCCCCGTTAACTT
GGACAATGAAAAGATAGCGAAAAAGCACCTCCACTATGCCATAGCTGAAC
TTGGAGTTGTCTCAATTAAAGAAATTGAGGGGAGATGGAAGAGATTCATA
AAGACCCTCGTAGAGGAGGGATACGTGGAAGTTACAAGAAATCCAATAAC
TGGAGAGGAAGAAATAAGACTCAGAAGACCTCCTGTCTATTCTTCAATTA
GAACGGCGAGCGATGAAAGCTACTTCTTAGTCGTGGATGAACCCTGGATA
AGGGGAGCTTTGCAGAGGAAGAGGGGAGCCGAACTTCTCCGTTTTGTAAA
CTACCTCAAAGTTAGAGGAATGGTAGTTGAGGAAGTTGATGAGATAGAAT
TCCACAGAAGTCTACTCCCTGGAATGGTCTACCTTTCAAGGGGAAGGCCC
TACATGGCAGTTGATAAGATAAAGATTGAGAAGTTCCACTTCGTTTTTGC
GAGGCCTCTTCCAATCGAAGAAGAAATAGATACTAGTTCAAGTAAAATTG
AAAACATTGAGATACTTGAGGTTAAAGACGAGAAACTGTTGGCCCAATA
AAAGTGAAGTTCGGAAGACTTAGAGTAAGGCACGAATACACTGGATACGC
CGTGAGGGGAAGAGACGTTGAAAGGCACGTTAAGAGATTAGAAGAGCTAA
AAGATGAGGGGATACTAAGGGGAGAGATTGACATCGTCCCATACATTTGG
GAATCCTGGAAGTTTGCGAGGGTACTCTTTGACACCCCCTACATTAGAGA
GTTTGAAACTGAAGGTTTCTGGCTTGAGTTTCCAAACGATATTAGGATAG
TTCCCGAAGAGGAGTTTAGGGAATTCTTTGCAGTGGCCTCTGAGATAGAT
CCAGAGCTCGCGATGTTCCTCTACAACAGAATTAGTAGAAAATCTCTATT
CCCCACGCTTCTGGGAGCAACCACACACTACATAAGGAGTTTCATCCTTC
```

(cont.)

Title: Pfu REPLICATION ACCESSORY FACTORS AND METHODS OF USE
Inventors: Holly H. Hogrefe et al.
Application No.: Not Yet Assigned
Filed: April 20, 2004
Attorney Docket No.: 04121.0161-02000
Page 18 of 37 (Figure 22 (cont.))

FIG. 22 (cont.)

ACCACGCCAAAGATAAGGGAGAAGAATTCGCATTTGCCGTAAAAAAGATG
ATCGACAGCAAGGATGGGATAGGCTCAGGGCTTCATGCAATTGAGCCCAA
TATAATAAAGCTTGCTCCAGTTGTGACTCATGTGGATTCGAGAGAAATAG
GCGGCTACAGCTACGATGACTTCCATGGAAAGCCAGTGATCTTCATCTAT
GATGGGAATGAAGGCGGAAGCGGAATAATTAGGCAGGTGTATGAGAACGT
AGAAAGCTGATGTACAGGAGTTTGGAGCATATAAAGAAGTGTCCATGCA
AAGACGGCTGTCCTGCCTGCATATATTCTCCCAAGTGCGGAACTTTCAAT
GAATTCCTCGACAAGTGGATGGCAATAAGAATATGGGAAAAAGTCCTTCC
TTAA

Title: Pfu REPLICATION ACCESSORY FACTORS AND METHODS OF
         USE
Inventors: Holly H. Hogrefe et al.
Application No.: Not Yet Assigned
Filed: April 20, 2004
Attorney Docket No.: 04121.0161-02000
Page 19 of 37 (Figure 23)

FIG. 23

```
ATGTTAATAGTTGTAAGACCAGGAAGAAAAAAGAATGAGCTCGAGGCTTTTA
TAATTGAAAACCCTCCAGAAAAGCTCTCTCAAAGAAGAAATTTAAAAGCTGA
TAGGGTAGTTAGGCTCATAATGAGAGATAATAGACTTTTTAAAGCTCTTGAA
GGAAGTCAGTATTTAAATCCAAAGGAAGTGGAGAGAGCCCTTAGAAATTCAA
GGATAGTTCTGGTGAATGCCAACGAGTGGGAAGAGTACTTTAAGAAGAGGTT
AATGAACAAAGAGTTGAAAAGCTGACATCTGTAGGCTCTGCCTTCTCAAT
GGGAAGATTACAGTACTCACTGAGGGAAACAGGATAAGATACAGAGATGAAT
ACATATGTGAAAGTTGTGCCGAGGAGGAGTTGAAGAGAGAGTTAAGATTTCG
ATTTAATTCCATAGGAATGCTTGAACAGGCAAAGAAGCTTTTAGAGAGATTC
AGAGATTTAGACAAGGTGATTTCAATTTTTGATCCATCCTTTGACCCCACTA
AGCATCCAGAGATAACAAAATGGGATGAGCTAAAGGCCAAGCATATAAGGGT
CGAGAAGATGCATATAGATGAGCTCAACATCCCCGAAGAATTCAAAAAAGTT
CTAAAGGCCGAAGGAATAAACGAACTACTCCCCGTTCAGGTGCTAGCGATTA
AAAACGGCCTCCTAGAGGGGGAGAATTTATTGGTGGTTTCAGCAACTGCGAG
TGGAAAAACTCTAATCGGAGAGCTTGCAGGTATTCCTAAGGCTCTAAAGGGA
AAGAAAATGCTGTTCCTAGTTCCTCTAGTAGCTTTAGCAAACCAAAAGTACG
AGGACTTCAAGAGAAGATACTCAAAGCTTGGATTAAAAGTAGCCATTAGAGT
CGGAATGAGCAGGATAAAGACCAAGGAAGAGCCAATAGTTCTGGATACTGGA
ACAGATGCACACATAATAGTGGGGACTTACGAAGGAATAGACTACCTTCTCA
GAGCTGGTAAAAAGATAGGAAACGTTGGAACGGTTGTAATAGATGAAATACA
CATGCTCGATGATGAGGAGAGAGGAGCTAGGCTAGATGGGCTCATTGCAAGG
TTAAGGAAGCTCTATTCAAATGCCCAATTTATTGGGCTTTCAGCAACCGTAG
GAAACCCTCAGGAGTTAGCCAGGAAGCTAGGGATGAAACTAGTGCTTTACGA
TGAAAGGCCCGTTGACTTAGAGAGGCATTTAATAATTGCGAGAAATGAGAGT
GAGAAGTGGAGGTATATAGCTAAGCTGTGCAAAGCCGAGGCCATGAGAAAGA
GCGAGAAGGGATTCAAGGGGCAGACGATAGTATTTACATTTTCAAGGAGAAG
ATGCCATGAGCTTGCCTCATTCCTAACGGGGCAGGGATTGAAGGCTAAGGCC
TACCACTCGGGCCTCCCCTATGTTCAGAGAAAGCTTACCGAAATGGAGTTTC
AAGCTCAAATGATTGATGTAGTTGTAACAACAGCTGCTTTAGGAGCGGGAGT
TGATTTTCCAGCATCCCAAGTCATCTTCGAAAGCTTGGCCATGGGAAACAAG
TGGATAACAGTTAGGGAGTTTCACCAAATGCTTGGCAGGGCTGGAAGGCCAC
AGTACCATGAGAAAGGTAAAGTTTACATAATAGTCGAGCCTGGGAAAAAGTA
CTCAGCTCAGATGGAGGGAACTGAAGATGAAGTCGCCCTCAAGCTCTTGACT
TCACCCATAGAACCAGTAATTGTTGAGTGGAGCGATGAATTTGAAGAGGATA
ATGTCTTAGCTCATGCCTGTGTGTTTAATAGACTTAAAGTTATTGAAGAAGT
TCAATCCCTCTGCCTGGGAGCAAACCAAAGTGCTAAAAATGTTTTGGAAAAA
CTTATGGAAAAGGGGCTCGTCAAAATATATGGAGATAAAGTTGAAGCAACCC
CATATGGAAGGGCGGTGAGCATGAGTTTCCTACTTCCTAGGGAGGCAGAGTT
CATCAGAGATAACTTGGAGAGCACTGATCCAATTGAGATAGCAATTAAACTG
CTACCGTTCGAAAACGTTTACCTCCCAGGATCGCTCCAGAGGGAAATAGAGT
CAGCTGTTAGAGGAAAGATAAGCTCAAACATCTTTTCAAGCTCCTTTGCATC
AGTGCTAGAAGAGCTTGACAAGATTATACCCGAAATAAGCCCAAATGCTGCA
GAAAGGCTATTCCTAATATACCAAGATTTCTTCAACTGCCCAGAGCAAGACT
GTACGGAGTTTGCAATGGAGAGAATTGGGAGAAAGATCATTGACTTAAGAAG
AGAGGGATACGAGCCCTCAAAAATCTCTGAGCACTTTAGGAAGGTCTATGCA
TTAATATTATACCCTGGAGATGTTTTTACATGGTTAGACGGAATTGTGAGAA
AACTCGAGGCAATTGAAAGAATAGCCCGAGTGTTCAATAAGAGAAGAGTGGT
AGAAGACACAATCAGGGTTAGAAGGGAAATTGAAGAAGGAAAAATTTTGAAG
GGTGAGAGACGATGA
```

Title: Pfu REPLICATION ACCESSORY FACTORS AND METHODS OF
       USE
Inventors: Holly H. Hogrefe et al.
Application No.: Not Yet Assigned
Filed: April 20, 2004
Attorney Docket No.: 04121.0161-02000
Page 20 of 37 (Figure 24)

FIG. 24

```
ATGCACAAATACTTCTTTCCATTACCTGCAACTAAGTCAACTTTCTTGCTC
CCTGCCGACCTCACCACAGCAAATCCATGCTTTTCCAAGAGCTTAATCAAT
TCTCTCTCTGCCTGGGCCCCTTTTCTATACATACAATGTTTTTCCTATCTA
CCTCTTATAAACTTTTTAAACTCCTTGACATACCCTCTCGAGATGCACATA
TTGATAAAAAAGGCAATAAAGAGAGATTTGGAAAGTTGAATGCCCTTCAA
CAATTAGCCTTTCATAAAATTAGGGGAGAAGGTAAAAGTGTTTTAATAATA
GCTCCGACAGGAAGCGGAAAAACTGAAGCCGCAGTAATTCCAATCTTAGAC
GCAATACTACGGGAGAATCTTAAACCTATAGCAGCTATTTATATAGCCCCA
TTGAAGGCACTAAATAGGGACTTGCTAGAGAGACTAAAGTGGTGGGAAGAA
AAAACTGGGGTAATAATAGAGGTTAGGCATGGGGACACGCCTACCTCAAAA
AGATTGAAGCAGGTAAAAAATCCTCCCCACCTATTAATTACAACCCCTGAA
ATGCTCCCTGCTATTCTTACGACAAGTCCTTCCGTCCCTATCTTAAGAAC
ACTAAATTTATCGTGATAGACGAGATTGGTGAACTTATAGAGAATAAAAGA
GGAACCCAGCTAATCCTAAATCTAAAAAGACTTGAATTAATTACAGAAGAT
AAACCAATAAGGATTGGCCTTTCTGCAACAATTGGAAGTGAAGAAAAGGTA
AGGCTTTGGATGGAAGCGGATGAAGTGGTAAAGCCTCGACTAAAAAGAAG
TACAAATTTACCGTTTTATACCCTCAGCCAATTCCAGAGGATGAAAAGCTT
GCTGAAGAGCTCAAAGTTCCAATAGAAGTTGCAACGAGGCTAAGAGTTGTG
TGGGATATTGTAGAAAGCACAAGAAGGTATTGATCTTTGTTAATACCCGA
CAATTTGCAGAGATCTTAGGGCATAGACTTAAAGCTTGGGGAAAACCTGTT
GAAGTTCACCATGGTAGCCTTTCAAGGGAAGCAAGAATAGAGGCAGAGAAG
AAACTTAAGGAAGGAAAAATAAAAGCACTAATTTGTACCTCATCAATGGAA
CTTGGCATTGACATAGGGGATGTTGATGCAGTTATTCAGTACATGAGTCCT
CGACAGGTAAATAGGCTAGTCCAGAGAGCTGGAAGAAGCAAACATAGACTG
TGGGAAACAAGCGAGGCTTACATCATAACCACAAACGTAGAAGATTATCTC
CAAAGCTTGGCAATAGCAAAGCTCGCACTAGAAGGAAAACTGGAAGATGTA
AATCCCTACGAAAATGCCCTTGATGTCCTGGCTCACTTTATAGTTGGTTTG
ACAATAGAATACAGAAATGTTAACATTACTGAACCCTATTCCCTTGCGAAA
TCTACTTATCCCTACAGAAAGCTCTCCTGGGAAGACTATCAGAAAGTTTTA
GAGATTTTAGAAGAGGCTAGAATAATAAGAAGAGATGGAGATGCAATTAAG
CTGGGAAAAAATGCCTTTAAGTATTATTTCGAGAACCTCTCAACAATACCT
GACGAAATAAGTTATGCAGTTATAGATATTGCAAGTGGAAAATCTGTTGGA
AGACTAGATGAAAACTTTGTTACGGAACTTGAAGAGTATGGAATTCATC
ATGCATGGAAGAAGCTGGATCGTGCTGGAAATTAACGAAAAGAAAGGATA
ATAAAGGTTAAGGAGAGCAACAATTTAGAAAGTGCACTGCCAAGTTGGGAA
GGGGAGCTCATTCCAGTTCCTTTGGAAGTTGCAGAATTTGTTGGAAAGCTG
AAGAGAGAGCTCCTATGGGACAAAGAGAGAGCATTAAAACTGCTTGAGGGC
GTTGAATTTAATAAGGAAGAACTCGAGGTTGCAATTTCCCAACTAGTAGAA
TCAGAACCAGTGGCGAGTGATAGAGATATCATTATAGAATCCTATCCAAAA
TTTGTGATAATTCATGCTGATTTTGGAAATAAAATTAACGAAGGGCTCACA
AGATTTATCTCAGTGTTTTTATCCGCCCGATATGGGAATATTTTCCTCCCA
AGAAGTCAAGCTCATGGAATTATAATTAGAAGCCCATTTAGGCTTAATCCT
GAAGAAATAAAGGAAATACTGTTAATGAAAGCAGAAGTTGGAGATATTGTT
GCTAGAGGAATTAGAGACACTCCAATATACCGCTGGAAGATGAGTGCAATT
GCTAAGAGATTCGGTGCCCTAAGAAGGGACGCGAGAATAAAAAAAGTAGAA
AGGCTGTTTGAAGGGACAATAATAGAGAAGGAGACTTTTAATGAAATTTAC
(cont.)
```

FIG. 24 (cont.)

CATGATAAAATCGACATTGATAAAACAGAGAAAATTCTAGAAAAAATAAGA
AAGGGAGAAATTAGAATGAAAACTTTGTTCAGAGAGGAAATAACGCCTCTT
TCCTCTTCTTTGGCAACCCTAGGAGGAGAGTTTCTAATTAGAGATATACTT
ACCCAGGAGGAAGTAGAAGAGATATTTAGGGAGAAGTTACTCGATGCTGAG
TTAGTCATGGTTTGTACAAACTGCGGATTTTCCTGGAGAACAAAAGTTCGC
AGGGTTATGGATAGAGTCAATGAGTTAAGCTGTCCCAAGTGTGATTCCAAA
ATGATAGCTCCTCTACACCCCAAAGATTCCGAAACTTTCATCTCAGCTCTC
AAAAAGTTAAAAGAGGAGAAAGCTTAGTAGGGAAGAAGAAAAGTATTAC
CTTAGAGGTTTAAAGGCGGCTGATTTACTTAAAGCCTACGGGAAGGACGCT
CTTTTAGCATTAGCTACCTATGGGGTTGGGGTAGAAAGCGCCACCAGAATA
CTTAGGGATTATAGAGGAAAATCCCTTATAAAAGCACTTATCGAGGCAGAG
AAACACTACATCCAAACTAGAAAGTTTTGGGAATAG

Title: Pfu REPLICATION ACCESSORY FACTORS AND METHODS OF
          USE
Inventors: Holly H. Hogrefe et al.
Application No.: Not Yet Assigned
Filed: April 20, 2004
Attorney Docket No.: 04121.0161-02000
Page 22 of 37 (Figure 25)

22 / 37

FIG. 25

```
GTGATGTTATTAAGGAGAGACTTAATACAGCCTAGGATATATCAAGAGGTA
ATATACGCCAAGTGCAAAGAAACAAACTGCTTGATTGTTCTGCCCACAGGA
TTAGGTAAGACGCTGATAGCTATGATGATAGCAGAGTATAGATTAACGAAA
TATGGCGGAAAAGTTCTAATGCTCGCCCCCACTAAGCCTCTCGTTCTTCAA
CATGCGGAAAGTTTTAGGAGGCTATTTAACCTCCCTCCAGAAAAAATTGTA
GCACTTACTGGAGAGAAGAGCCCAGAAGAGAGAAGTAAGGCCTGGGCGAGA
GCAAAAGTAATTGTAGCCACTCCTCAAACTATTGAAAATGACTTATTGGCG
GGAAGAATATCTTTAGAAGACGTTTCGCTAATAGTATTCGATGAAGCTCAC
AGAGCTGTGGGCAATTACGCTTACGTCTTTATAGCAAGAGAGTATAAAAGA
CAGGCCAAAAACCCACTTGTTATAGGGTTAACAGCCTCCCTGGGAGCACT
CCTGAAAGATCATGGAGGTAATAAATAACTTGGGAATTGAGCATATTGAA
TACCGCTCCGAAAATTCTCCCGATGTTAGACCTTACGTTAAGGGAATAAGG
TTTGAATGGGTTAGGGTTGATCTCCCAGAAATATACAAGGAAGTAAGGAAA
CTTTTAAGAGAAATGCTTAGAGATGCCCTTAAACCGTTGGCAGAAACTGGA
CTTCTTGAATCTTCTTCCCCAGACATTCCAAAGAAAGAAGTTCTTAGAGCT
GGGCAAATAATAAACGAAGAAATGGCGAAAGGTAATCATGATCTCAGAGGC
TTGCTTCTCTATCACGCAATGGCTCTTAAGCTACATCATGCAATTGAGCTG
TTGGAAACCCAAGGGTTATCCGCCCTGAGGGCTTATATAAAGAAGTTGTAT
GAGGAGGCAAAAGCGGGATCAACAAAGGCTAGCAAGGAAATATTCTCGGAT
AAGAGAATGAAAAAGGCAATCTCACTTTTAGTTCAAGCGAAGGAGATTGGG
CTTGATCACCCCAAGATGGACAAGTTAAAAGAAATAATTAGGGAACAACTC
CAAAGGAAACAAAATTCCAAAATCATAGTTTTCACTAACTACAGAGAAACT
GCAAAAAAGATAGTCAATGAACTTGTGAAAGATGGAATAAAAGCTAAAAGG
TTCGTTGGACAGGCCAGCAAAGAAAATGACCGTGGACTGAGTCAGAGAGAG
CAGAAATTAATTCTTGACGAATTCGCTAGAGGAGAATTCAACGTTCTAGTG
GCAACGAGTGTAGGAGAGGAAGGACTTGACGTGCCGGAAGTTGATTTGGTT
GTGTTTATGAGCCAGTACCATCTGCCATAAGGAGCATCCAAAGAAGGGGT
AGAACTGGCAGGCATATGCCGGGGAGAGTTATAATCCTAATGGCCAAGGGG
ACTAGAGATGAAGCATACTACTGGAGTTCCAGGCAAAAGGAAAAGATAATG
CAAGAGACAATAGCTAAGGTGAGTCAGGCAATTAAAAAGCAGAAGCAAACT
TCTCTAGTTGATTTTGTGAGAGAAAAAGAGAGCGAAAAGACCTCTCTAGAC
AAGTGGTTGAAAAAGGAAAAAGAAGAAGCAACTGAAAAAGAGGAAAAGAAG
GTAAAGGCTCAAGAGGGTGTAAAAGTCGTCGTAGATAGCAGAGAGCTTAGG
AGTGAGGTTGTGAAGAGACTTAAACTTCTTGGTGTAAAGTTAGAGGTTAAA
ACGCTCGATGTGGGAGATTATATAATTAGTGAGGACGTTGCAATTGAGAGG
AAGTCAGCTAACGACTTCATTCAGTCAATTATTGATGGTAGACTTTTTGAT
CAAGTTAAGAGGCTCAAAGAGGCATACTCAAGACCGATAATGATAGTCGAA
GGTTCTTTATACGGAATTAGAAACGTCCATCCAAATGCAATAAGGGGGGCA
ATAGCAGCGGTAACCGTAGACTTTGGGGTCCCAATAATATTTTCATCTACT
CCAGAGGAAACCGCTCAATACATCTTTCTAATTGCAAAGAGGGAGCAAGAG
GAGAGAGAAAAACCTGTGAGAATTAGAAGTGAGAAGAAGGCCCTTACCCTT
GCCGAGAGGCAGAGGTTAATAGTTGAGGGATTACCTCACGTCTCAGCAACT
CTAGCTAGGAGATTGTTGAAGCACTTTGGAAGTGTGGAAGGGTATTCACT
GCAAGCGTTGCTGAGTTAATGAAAGTTGAAGGCATAGGAGAGAAGATTGCT
AAGGAGATTAGAAGGGTAATAACTGCCCCATATATAGAGGATGAGGAGTAG
```

Title: Pfu REPLICATION ACCESSORY FACTORS AND METHODS OF
USE
Inventors: Holly H. Hogrefe et al.
Application No.: Not Yet Assigned
Filed: April 20, 2004
Attorney Docket No.: 04121.0161-02000
Page 23 of 37 (Figure 26)

23 / 37

FIG. 26

```
TTGAAAGGGTTGTTTAGGGACGTTATCCTCCACAACCCCCACCTTTTTGTT
TATTCCTATTCTGATAAAGGCATCATTCCTTTCAAGCATCAGTTCCAGACC
CTCTATCATGCCATGCTCATGAGGCCAGTGAGGCTAATGATAGCTGATGAG
ATAGGTCTCGGAAAGACCATTCAAGCTCTTTTAATAGCCAAGTACCTCGAT
TTTAGGGGAGAGATTGAGAAAGCCTTGATAGTCGTTCCAAAAGTTCTGAGG
GAGCAGTGGAGGGAAGAAGTAAAGAGGATCTTAGAGGAAGCTCCGGAAGTG
ATAGAGAATGGTAGCGAAATTGAATGGAAGTTGAAAAGGCCGAGGAAGTAC
TTCATAATATCAATAGACCTAGCTAAGAGATACACCGAGGAAATACTCCGT
CAAAAGTGGGATTTAGTAATAGTTGACGAAGTCCACAACGCCACCCTGGGA
ACACAGAGATATGAGTTCTTAAAAGAACTAACCAAGAACAAGGATTTGAAC
GTTATATTCCTTTCAGCAACCCCCACAGGGGAAACAATAGAGATTACCTT
GCGAGGCTTAGGCTCCTCGACCCAACTATACCAGAGGAAATATCCCCAATG
CACGAAAGGAAGATCTACATGAAGTCAAGAGGGACATTGGTACTAAGGCGA
ACTAAGAAGGTTGTCAACGAACTTGAAGGAGAAGTGTTCAAGAAGTGTCAC
TTTGGGGCTGTCGTGGTAGAAGTTAGCAGAGAGGAGAGGGAGTTCTTTGAA
GAGTTAAATAGAGCGCTATTCGAGCTGATTAAGGATCAAGCTGATTACTCT
CCCTTAACTCTTCTTGCAGTAATCATTAGGAAGAGAGCCTCGTCCAGCTAC
GAAGCGGCTCTAAAAACCCTAACCAGGATCGTTGAAAGCGCTTATATAAGT
GGGCAAGAAAGAGCCAGAGGCGTTGAATCATACATTGAAAGATCTTTAGA
ATGGGGTATGAGGAATTGGAAATAGAAGAATTTAACGAGATAGATGATGCG
ATACACAAAATAATAGATGAATATAGGGGATTCTTAACTGAAGAGCAACTC
GAAAGGCTTAGAAGAGTTCTCGAGCTTGGAAAGAAAATTGGCAGCAAGGAT
AGCAAGCTTGAGGTTATATCCGATATAGTTGCTTATCACATTAGGAACGGC
GAAAAGGTCATAATATTCACGGAATTTAGAGATACCCTCGAATACGTACTT
GAGAGGTTACCAGATATCCTAAGGAGAAAGCACGGCATTGTTTTGGAAAAA
GATGACATTGCAAAACTTCATGGGGGCATGAAATCTGAGGAAATAGAGAGG
GAAATCAACAAGTTTCATGAAAGGGCTAACCTATTAGTCTCTACGGATGTT
GCATCCGAAGGACTTAACCTGCACGTTGCAAGTGTTGTAATAAACTACGAG
GCCCCCTGGAGCCCAATAAAGCTCGAACAGAGGGTGGGAAGAATATGGAGG
CTCAACCAAACGAGAGAAACCAAAGCATATACCATATTTCTTGCAACGGAA
ACGGACTTGGATGTTCTAAACAACCTCTATAGAAAGATTATGAACATAAAG
GAAGCCGTGGGAAGTGGACCCATTATTGGAAGGCCAATATTTGAAGGAGAC
TTTGAAAATCTATGGAATGAAGGTGCCGAGGAAGAAAATAGAGAAGTCTCA
GAGTATGAGCTTATCCTAGCCTCAATTAAGGGAGAACTCAAGGGCTATGCC
GGGGCTCTAGTTAGGACTCTCAGAATCCTAAAGCAGAAAGTGGAGGGAGCA
GTTCCTGTAAATCCTGCGGGAAGCATAAGGAGAGAGCTCGAGATAATTTTA
GAGGACACTCCTGATGTGGAAGTATTAAAGAAATCGTTAATAGGAACGTT
CCAAATCCGTTCCGCTTGGTGAGAGGACTTTTAAGAGAAGCCGAGGGGATT
GAGGGAATTAGAGTATTAGTTAAGGGCTATGATGGCTCTATGGATGTGTAC
TATGCCATATTCTACGACGAAGATGGGAGAGAAATTTATAGATATCCAATT
CTTGCTGAGAACGGAAAGTACCTTGTTGGATTCAACTTACTCAAGAGGATT
AGTGAGGTACTATCCAAAGAGTACAAGGTCGTTAGAGGGGCAAGTGAAGAG
GTGGACTATAAAGTTAAGACGCTAGTTATGGACAACATATACAATTTAATC
GTGAAGAAGTATCTGGAATACGATAGCTTAAACATCAAAGAAGGTAAAATC
TTCAAGAGGCTTAAGGTTGAAATAAAGAAAGCCCTCGAGGTAAAGGGGATA
```
(cont.)

Title: Pfu REPLICATION ACCESSORY FACTORS AND METHODS OF USE
Inventors: Holly H. Hogrefe et al.
Application No.: Not Yet Assigned
Filed: April 20, 2004
Attorney Docket No.: 04121.0161-02000
Page 24 of 37 (Figure 26 (cont.))

FIG. 26 (cont.)

```
AGTGAAGAAGAATTCGAAGTCATCAAGAGAGTTCCCCCTGAGATTATGGAA
GTTCTAGGGTTAGATTCCACAAAAATAGAACTACCTACCAACGAATACCTC
AAGATCTTCGAAAGGAACTTTGTTCCTCTGGATAAAATCCTTGAGAGTGAA
AAGAAGGCCATGGAAATAGTCATGGAGCTAGAGAAGAGCAGAGGATATAAC
GTTGAGGACGTATCTTTAAGGGAGCACTATGACATAAGGGCCTTTACAGAT
GGTGAAGAGAAGTACATAGAGGTCAAAGGCCACTATCCAATGCTCCTACTT
GCGGAGTTAACGGAAAAGGAATTTGAGTTCGCACAAAAAAATGAAGATAAG
TACTGGATATACATAGTCTCGAACATTGCCAAAGACCCCGTAATTGTAAAA
ATTTACAAACCATTTTCCCAGGATAGAAGAGTATTCGTGGTTAAGAATGGG
GAAGATGTTGAGGTTAATATCAACATTGAGATAAAGAAGAAAGATAGGCAT
TTACTTAAGTTAAGCTAG
```

Title: Pfu REPLICATION ACCESSORY FACTORS AND METHODS OF
          USE
Inventors: Holly H. Hogrefe et al.
Application No.: Not Yet Assigned
Filed: April 20, 2004
Attorney Docket No.: 04121.0161-02000
Page 25 of 37 (Figure 27)

25 / 37

FIG. 27

GTGATTACTTTGGAGCTACATCCAAGTGAGATAGCTAGATATTTCGAGCTT
GAAGAGTGTTCCCACTATTTCTCTAACCTACTTTTAAGAAAGAGAGGCGAA
TTGCAGGAATTTGAGCCGATAATAAGGAGAAAAGAAATAGAAACCATAGAG
CTCGCCAAATGGGGAGACGAGTTCGAGCTCTCCCTTCTTCAGGAATTTAAA
AAAGGTGAAGCATTAAAAAAGCTTGGAGTTAAAGAACTACCAAGATTCTAT
GGTTTTTTAACGGAAAACGACACCCCTGTAAGAAAGTTCTTTGAAAAGTAC
TTTAAAGATGGAATAATAGTGGAAGAAGATCCAGACAAACTTTTAGAAATT
ATAAACAGTGAGAAAGTGCCGTTATCTATCAAGCCCCCTTAAAAGGCAGA
ATAGGGAAATTTGATGTCTCAGGAAGGGCAGACTTCATAATAAAGGTTGGG
AAAACACTTTACCTACTCGAGGCTAAGTTTACTAAGGAAGAGAAGTTCTAC
CACAGGATTCAGGCCATTATCTATGCTCACCTTCTAAGTCAAATGATCGAA
GGTTACGAAATTAAACTAGCTGTTGTAACAAAGGAGAACTTTCCCATTCCC
TCAAACTTCCTAAGATTCCCAGGAGACGTGGAAGAGTTAAAGATAACCCTA
GAAGAAAGCTTGGTGGAATACTAAGAGAACAAGAACTTTGGATAGACGCA
AGGTGTACTACTTGCCCCTTTGAGGCTTTATGCTTGTCTAAGGCTCTTGAG
GAAAGAAGTCTAGGACTATTAAGCCTTCCCCCTGGGATAATTAGAATACTC
AAAGAAGAAGGGATAAAAGACTTAAAAGACATGGCTAAGCTATTTGAATTC
AAAGAAAATTCCCCTACAAACTTTGAAGAGCCCTCAATAAAAGATCCAAAG
AAGACTCAAGAGATAGCAAAAAGAACGGGAATAAACTTACTAAAGCTCTCA
AGGATAGCTCAGGCAATCCTTAAATATTTAGATGAGGGAGAAACAACACCC
CTGTTCATCCCCAGGACGGGGTATAATCTGCCAATGGATGAGAGAGTAGGT
GATGTTGAGCCCTCTTACTATCCTCCAAGGAGCTTAGTGAAAGTGTTCTTC
TATGTCCAGACAAGCCCAATAACAGACACAATAATCGGAATTTCAGCCCTT
GTAAAGAATAGGCAAAATGGAGAGCGGATAATTGTTAAGTTCGTCGATGAG
CCCCCCATAGAAGTTTCAGATGCCCAAGAAAAGGAGAGAATGCTTCTAATT
GAGTTCTTTAGGGATGTTATTGATGCCGTAAAGTCACTATCTCCAACCGAT
AAAGTCTACCTACACATGTACTTTTACAATAGAAAACAGAGAGATGACCTT
ATGGATGCCGTAAAGAGACACAAAGAGATAAGAGAAAACAATGCAGTCATG
GCCTTGCTAAGCTTGAGAAGAGCCATAGATTGGGAGAGCTTTTCAATAATA
AAGGATGAGATAATAAGGAGGCATGCCTTACCACTTTCTCCTGGCCTGGGA
TTCGTTACAGTTGCTACTCAGTTTGGATACAGATGGAGAAGGAACAAAACC
TTTGCGCGAATGCTTGAGGTTGTAGCAAGAAGAGAAAATGGTAAGATAAAT
CTCAAAACTCTCCTTAACATTTCTGAAACGGGAATTGGGCCAGAATATTAT
CCAATCATCGATAGGGATAACGAAGGAATACCCTTCACACTTTTCTGGAGC
GCACTGGTCAAATTAGCTACTGAGGAAGACAATTCAAGAATTAAGAGGGAT
ATAAGGGACATACTCTCCCAAATGGTTGAGGCCCTCAAAACAATTGAAGAG
AGAATTCCCGAGCAATATAAAGACGCCTTCGTGAAAAAGAGGGAATACCC
AAAGAAGATCTCGAAAACTTTGACATAAAGAAGGAAGAATTAGCTGATATC
CTTCTTGAATACTTACAATTAGAGTTCGATGCAAGATTTAGAGAACGATCC
GAATACTATAGGCTTCCCCTATCAATAAGAGCATACTCAGAGGAATCAGCA
CTAATTAAGATAGAAAACATTGAAAAGAAGAAAAATGACTGTCTGTTGTTT
GGAAAAATCGTGCTAATTGACGAAATGGAAGAATAAAAGAGTATAATCCA
AAAGAAGTTCTTATAGATATTGATGAAGGTTCTCTTGTAGTTGTAACGCCA
AAGAAATTCTTAGATAAGCTAAGAAGAGATCCCGTTCAAAGAATAAGCAAA
TCACCGTTAGGAATAGTTGAGGCTATAGATCACGAGACAGGAAAAGTTGTT
ATAAGGTTAATAAGAGTCTCTCCAGGCAGATTTACACTCAAACACTCTAAG

(cont.)

Title: Pfu REPLICATION ACCESSORY FACTORS AND METHODS OF
USE
Inventors: Holly H. Hogrefe et al.
Application No.: Not Yet Assigned
Filed: April 20, 2004
Attorney Docket No.: 04121.0161-02000
Page 26 of 37 (Figure 27 (cont.))

26 / 37

FIG. 27 (cont.)

TTTAGTTGTAAAAATGGACTATTGACAATAACCTATCCTGAAGGGGAAGTG
AAAGTTACTCCTGGAGAGATAGTTATAGTAGATCCTAGCGTCGATGACATA
GGAATGGAAAGGGCATACAATGTGCTCTCAGAAATATCCCAAGGGGAACTC
AAGCATGAAATTTATCAGAAGGTCAAAGCAATATACGAAGGGAACACGGAA
TCAAGATACGAAGTCAACATCTGGAAGAAAAGCACATAGAAGAATTTCTC
TCCAGAGTTAAGAAGATCAACGAAGAACAGAAAAGTTTGCAATTGACATA
AACAACTTTCTAGTCACCCTTCAAGGCCCCCCTGGGACTGGGAAGACATCA
GGGGCCATAGCCCCAGCAATTCTCGCAAGAGCATATTCAATGGTGAAGGAC
AAAAAGAATGGCCTCTTTGTAGTTACTGGAGTCTCACACAGGGCAGTTAAT
GAGGCCCTGATAAAGACTTTAAAGCTAAAGAAAGAGCTGGAGAATACATTA
AAAGAGCTTAGAAAGATAGATCTAATTAGAGCAGTCTCTGGGGAAGAGGCA
ATCAAAATAATTAAAGAGGAACTAGAGAGGGAAATAAAGGATGATGTCGAC
AGAATTAGATTTACAGCACAAGAAATTACCCACTCTTCAAAGCAAAGATCA
TTAGACAAATATTTTGCTAATTCTGGAACTGTGAGGATAGTATTTGGAACA
CCACAGACTTTGAACAAGCTTATGAAGAATACAAAAGAAGTCGAACTAGTT
GTCATAGATGAAGCTAGTATGATGGACTTACCAATGTTCTTCCTCTCAACA
AAAGTTTGTAAAGGTCAAGTTCTCTTGGTCGGGGATCACAGGCAGATGGAG
CCAATTCAAGTCCATGAATGGCAATTAGAGGACAGAAAGACATTTGAAGAG
CACTATCCATTCCTTTCAGCCCTTAACTTCATTAGATTTCTCAGGGGAGAG
TTGGATGAAAGAGAACTTAAGAAGTTTAAGAGAATCCTTGGAAGGGAACCT
CCAGAATGGAAGAAGGACAAGAACGAGGTTCTCCCTCTCTATAGGTTAGTA
AGAACTTATAGGTTGCCCCAGGAAATAGCTGATCTACTGAGTGATGCAATA
TACAGAGCAGATGGCATAAAATTGATTAGTGAAAGAAAAGAGGAGAAAG
ATAATTGCCAGGCACAAGGATGAGTTTCTATCGATAGTTTTAGATGACAGG
TATCCTTTCGTTCTAATACTTCATGACGAGGGCAATTCCACAAAGATTAAC
GAGCTGGAAGCAAAGATAGTAGAGAAGATAATCAAAAGAGTAGAGAATATT
GATATAGGAGTTGTAGTTCCATATAGAGCTCAAAAGAGATTAATAGCTTCA
TTAATAGATAGTGCCCAGGTGGACACAGTTGAGAGATTCCAAGGGGGAGAG
AAATCTTTAATAGTAATTTCAATGACTTCCAGCGACCCCCGCATACCTGGG
AAAGGTTTTTGA

Title: Pfu REPLICATION ACCESSORY FACTORS AND METHODS OF
         USE
Inventors: Holly H. Hogrefe et al.
Application No.: Not Yet Assigned
Filed: April 20, 2004
Attorney Docket No.: 04121.0161-02000
Page 27 of 37 (Figure 28)

27 / 37

FIG. 28

ATGAACATAAAGAGCTTCATAAACAGGCTTAAGGAGCTAGTTGAAATCGAG
AGGGAAGCTGAAATAGAGGCTATGAGGTTGGAGATGAAAGGCTTAGCGGA
GTGGAGAGGGAGAGGTTAGGTAGGGCAATTCTCAGCTTAAACGGTAAAATC
GTTGGTGAAGAGCTCGGTTATTTCTTGGTTAAGTACGGAAGGAATAAGGAG
ATAAAGACCGAGATCAGCGTTGGGGATTTGGTTGTTATAAGCAAGAGGGAT
CCCCTGAAGAGCGACCTCCTGGGAACTGTTGTTGAGAAGGGGAAGAGATTC
ATCGTCGTTGCCTTAGAACCAGTCCCAGAGTGGGCCCTTAGAGATGTGAGG
ATAGACCTCTACGCCAACGATATAACATTCAAGAGGTGGATCGAAAACCTC
GACAGGGTTAGGAAGGCTGGAAAAAAGGCTTTAGAGTTTTACTTAGGTTTA
GATGAGCCTTCCCAGGGGGAGGAAGTGAGCTTTGAACCCTTTGATAAGAGC
CTAAACCCCTCTCAAAGGAAAGCGATAGCTAAGGCTTTAGGTAGTGAAGAC
TTCTTCCTTATCCACGGCCCCTTTGGAACTGGAAAGACGAGGACTTTAGTT
GAGCTGATTAGGCAGGAGGTAAAGAGGGGGAACAAAGTTCTAGCTACAGCT
GAGAGCAACGTTGCCGTGGACAATTTAGTTGAAAGATTGGCCAAAGATGGA
GTTAAGATAGTTAGGGTTGGGCACCCAAGTAGGGTTTCGAGGCATTTGCAC
GAGACAACTTTAGCTTACCTCATTACTCAGCACGAGCTCTACGGTGAGCTT
AGGGAGCTTAGGGTGATAGGGCAGAGTTTGGCAGAGAAGAGGGACACATAT
ACAAAGCCGACTCCAAAGTTCAGGAGGGGACTGAGTGATGCTGAGATAATT
AAGTTGGCCGAGAAGGGAAGAGGGGCTAGAGGACTCTCAGCTAGACTAATA
AAGGAGATGGCCGAGTGGATAAAGCTAAACAGGCAGGTTCAGAAGGCCTTT
GAAGATGCTAGAAAGCTTGAGGAGAGGATTGCGAGGGATATAATTAGGGAA
GCCGATGTGGTTTTGACAACTAACTCTTCTGCAGCCCTTGATGTTGTTGAT
GCTACCGATTATGATGTTGCGATAATAGATGAAGCAACTCAGGCAACTATA
CCGAGCATATTAATACCTCTCAACAAGGTTGATAGGTTTATACTTGCTGGA
GACCACAAGCAACTACCACCAACTATCTTAAGCTTGGAGGCCCAGGAGCTC
TCCCACACGCTTTTCGAGGGTTTAATTGAGAAGTACCCATGGAAGAGCGAA
ATGCTGACAATTCAGTATAGGATGAATGAGAGGATAATGGAGTTTCCGAGC
AGGGAGTTTTACGATGGAAGAATAGTTGCTGATGAAAGTGTAAAAAACATA
ACTCTGGCCGACCTGGGAATTAAAGTTAATGCTAGTGGAATATGGAGGGAC
ATCCTAGATCCAAACAACGTCCTCGTGTTCATAGATACTTGCATGCTCGAA
AATAGGTTCGAGAGGCAGAGAAGGGGAAGCGAAAGCAGGGAGAATCCCTTG
GAGGCCAAGATAGTGAGCAAAATCGTTGAAAAGCTCTTGGAAAGTGGGGTT
AAAGCGGAAATGATGGGAGTGATTACACCTTACGATGACCAGAGGGATTTG
ATAAGCTTGAATGTTCCCGAAGAAGTTGAGGTCAAGACTGTGGATGGTTAC
CAGGGAAGGGAGAAGGAAGTGATAATTCTATCATTTGTCCGCTCTAACAAA
GCGGGAGAGATCGGCTTTCTCAAGGACTTGAGGAGGCTAAACGTGTCCTTA
ACTAGGGCTAAGAGGAAGCTTATCATGATTGGCGATTCCTCAACGCTTTCA
TCTCACGAAACCTACAGGAGGTTAATCGAGCACGTGAGGGAGAAGGGGTTA
TATGTTGTGCTAACGAAGGATAGCATTTGA

Title: Pfu REPLICATION ACCESSORY FACTORS AND METHODS OF
         USE
Inventors: Holly H. Hogrefe et al.
Application No.: Not Yet Assigned
Filed: April 20, 2004
Attorney Docket No.: 04121.0161-02000
Page 28 of 37 (Figures 29 and 30)

28 / 37

FIG. 29

MIEELFKGLESEIVGLHEIPPKRGEYGEFKFRNEEVNELVKRLGFRLYSHQ
VKALEKLYSGKNVVVSTPTASGKSEIFRLFIFDEILSSPSSTFLLIYPTRA
LINNQMEKFEKENTIFEEICGKRVRAEVLTGDTEWEKRREIIRSKPNVIFT
TPDMLHHHILPRWRDYFWLLKGLRLLVVDELHVYRGIFGTNVAYVFKRLFL
RLKRLSSSPQILALSATLRNPKEFAEQFFETEFEEVKEAGSPSPRRIIVMF
EPRRFTGEQLIKQIVERLTRKNIKTLVFFDSRKGTERIMRLFLFSDAFDRI
TTYKGTLTKRERFLIERDFREGNLTVLLTTNALELGIDIGDLDAVINYGIP
SDGLFSLIQRFGRAGRDPNRIAINGIILRRNGLDYYYKEHFDELVEGIEKG
LVEKIPVNLDNEKIAKKHLHYAIAELGVVSIKEIEGRWKRFIKTLVEEGYV
EVTRNPITGEEEIRLRRPPVYSSIRTASDESYFLVVDEPWIRGALQRKRGA
ELLRFVNYLKVRGMVVEEVDEIEFHRSLLPGMVYLSRGRPYMAVDKIKIEK
FHFVFARPLPIEEEIDTSSSKIENIEILEVKDEKTVGPIKVKFGRLRVRHE
YTGYAVRGRDVERHVKRLEELKDEGILRGEIDIVPYIWESWKFARVLFDTP
YIREFETEGFWLEFPNDIRIVPEEEFREFFAVASEIDPELAMFLYNRISRK
SLFPTLLGATTHYIRSFILHHAKDKGEEFAFAVKKMIDSKDGIGSGLHAIE
PNIIKLAPVVTHVDSREIGGYSYDDFHGKPVIFIYDGNEGGSGIIRQVYEN
VEKLMYRSLEHIKKCPCKDGCPACIYSPKCGTFNEFLDKWMAIRIWEKVLP

FIG. 30

MLIVVRPGRKKNELEAFIIENPPEKLSQRRNLKADRVVRLIMRDNRLFKAL
EGSQYLNPKEVERALRNSRIVLVNANEWEEYFKKRLMNKRVEKADICRLCL
LNGKITVLTEGNRIRYRDEYICESCAEEELKRELRFRFNSIGMLEQAKKLL
ERFRDLDKVISIFDPSFDPTKHPEITKWDELKAKHIRVEKMHIDELNIPEE
FKKVLKAEGINELLPVQVLAIKNGLLEGENLLVVSATASGKTLIGELAGIP
KALKGKKMLFLVPLVALANQKYEDFKRRYSKLGLKVAIRVGMSRIKTKEEP
IVLDTGTDAHIIVGTYEGIDYLLRAGKKIGNVGTVVIDEIHMLDDEERGAR
LDGLIARLRKLYSNAQFIGLSATVGNPQELARKLGMKLVLYDERPVDLERH
LIIARNESEKWRYIAKLCKAEAMRKSEKGFKGQTIVFTFSRRRCHELASFL
TGQGLKAKAYHSGLPYVQRKLTEMEFQAQMIDVVVTTAALGAGVDFPASQV
IFESLAMGNKWITVREFHQMLGRAGRPQYHEKGKVYIIVEPGKKYSAQMEG
TEDEVALKLLTSPIEPVIVEWSDEFEEDNVLAHACVFNRLKVIEEVQSLCL
GANQSAKNVLEKLMEKGLVKIYGDKVEATPYGRAVSMSFLLPREAEFIRDN
LESTDPIEIAIKLLPFENVYLPGSLQREIESAVRGKISSNIFSSSFASVLE
ELDKIIPEISPNAAERLFLIYQDFFNCPEQDCTEFAMERIGRKIIDLRREG
YEPSKISEHFRKVYALILYPGDVFTWLDGIVRKLEAIERIARVFNKRRVVE
DTIRVRREIEEGKILKGERR

Title: Pfu REPLICATION ACCESSORY FACTORS AND METHODS OF
        USE
Inventors: Holly H. Hogrefe et al.
Application No.: Not Yet Assigned
Filed: April 20, 2004
Attorney Docket No.: 04121.0161-02000
Page 29 of 37 (Figures 31 and 32)

·29 / 37

FIG. 31

MHKYFFPLPATKSTFLLPADLTTANPCFSKSLINSLSAWAPFLYIQCFSYL
PLINFLNSLTYPLEMHILIKKAIKERFGKLNALQQLAFHKIRGEGKSVLII
APTGSGKTEAAVIPILDAILRENLKPIAAIYIAPLKALNRDLLERLKWWEE
KTGVIIEVRHGDTPTSKRLKQVKNPPHLLITTPEMLPAILTTKSFRPYLKN
TKFIVIDEIGELIENKRGTQLILNLKRLELITEDKPIRIGLSATIGSEEKV
RLWMEADEVVKPRLKKKYKFTVLYPQPIPEDEKLAEELKVPIEVATRLRVV
WDIVEKHKKVLIFVNTRQFAEILGHRLKAWGKPVEVHHGSLSREARIEAEK
KLKEGKIKALICTSSMELGIDIGDVDAVIQYMSPRQVNRLVQRAGRSKHRL
WETSEAYIITTNVEDYLQSLAIAKLALEGKLEDVNPYENALDVLAHFIVGL
TIEYRNVNITEPYSLAKSTYPYRKLSWEDYQKVLEILEEARIIRRDGDAIK
LGKNAFKYYFENLSTIPDEISYAVIDIASGKSVGRLDENFVTELEESMEFI
MHGRSWIVLEINEKERIIKVKESNNLESALPSWEGELIPVPLEVAEFVGKL
KRELLWDKERALKLLEGVEFNKEELEVAISQLVESEPVASDRDIIIESYPK
FVIIHADFGNKINEGLTRFISVFLSARYGNIFLPRSQAHGIIIRSPFRLNP
EEIKEILLMKAEVGDIVARGIRDTPIYRWKMSAIAKRFGALRRDARIKKVE
RLFEGTIIEKETFNEIYHDKIDIDKTEKILEKIRKGEIRMKTLFREEITPL
SSSLATLGGEFLIRDILTQEEVEEIFREKLLDAELVMVCTNCGFSWRTKVR
RVMDRVNELSCPKCDSKMIAPLHPKDSETFISALKKLKRGEKLSREEEKYY
LRGLKAADLLKAYGKDALLALATYGVGVESATRILRDYRGKSLIKALIEAE
KHYIQTRKFWE

FIG. 32

VMLLRRDLIQPRIYQEVIYAKCKETNCLIVLPTGLGKTLIAMMIAEYRLTK
YGGKVLMLAPTKPLVLQHAESFRRLFNLPPEKIVALTGEKSPEERSKAWAR
AKVIVATPQTIENDLLAGRISLEDVSLIVFDEAHRAVGNYAYVFIAREYKR
QAKNPLVIGLTASPGSTPEKIMEVINNLGIEHIEYRSENSPDVRPYVKGIR
FEWVRVDLPEIYKEVRKLLREMLRDALKPLAETGLLESSSPDIPKKEVLRA
GQIINEEMAKGNHDLRGLLLYHAMALKLHHAIELLETQGLSALRAYIKKLY
EEAKAGSTKASKEIFSDKRMKKAISLLVQAKEIGLDHPKMDKLKEIIREQL
QRKQNSKIIVFTNYRETAKKIVNELVKDGIKAKRFVGQASKENDRGLSQRE
QKLILDEFARGEFNVLVATSVGEEGLDVPEVDLVVFYEPVPSAIRSIQRRG
RTGRHMPGRVIILMAKGTRDEAYYWSSRQKEKIMQETIAKVSQAIKKQKQT
SLVDFVREKESEKTSLDKWLKKEKEEATEKEEKKVKAQEGVKVVVDSRELR
SEVVKRLKLLGVKLEVKTLDVGDYIISEDVAIERKSANDFIQSIIDGRLFD
QVKRLKEAYSRPIMIVEGSLYGIRNVHPNAIRGAIAAVTVDFGVPIIFSST
PEETAQYIFLIAKREQEEREKPVRIRSEKKALTLAERQRLIVEGLPHVSAT
LARRLLKHFGSVERVFTASVAELMKVEGIGEKIAKEIRRVITAPYIEDEE

Title: Pfu REPLICATION ACCESSORY FACTORS AND METHODS OF
        USE
Inventors: Holly H. Hogrefe et al.
Application No.: Not Yet Assigned
Filed: April 20, 2004
Attorney Docket No.: 04121.0161-02000
Page 30 of 37 (Figure 33)

30 / 37

FIG. 33

LKGLFRDVILHNPHLFVYSYSDKGIIPFKHQFQTLYHAMLMRPVRLMIADE
IGLGKTIQALLIAKYLDFRGEIEKALIVVPKVLREQWREEVKRILEEAPEV
IENGSEIEWKLKRPRKYFIISIDLAKRYTEEILRQKWDLVIVDEVHNATLG
TQRYEFLKELTKNKDLNVIFLSATPHRGNNRDYLARLRLLDPTIPEEISPM
HERKIYMKSRGTLVLRRTKKVVNELEGEVFKKCHFGAVVVEVSREEREFFE
ELNRALFELIKDQADYSPLTLLAVIIRKRASSSYEAALKTLTRIVESAYIS
GQERARGVESYIEKIFRMGYEELEIEEFNEIDDAIHKIIDEYRGFLTEEQL
ERLRRVLELGKKIGSKDSKLEVISDIVAYHIRNGEKVIIFTEFRDTLEYVL
ERLPDILRRKHGIVLEKDDIAKLHGGMKSEEIEREINKFHERANLLVSTDV
ASEGLNLHVASVVINYEAPWSPIKLEQRVGRIWRLNQTRETKAYTIFLATE
TDLDVLNNLYRKIMNIKEAVGSGPIIGRPIFEGDFENLWNEGAEEENREVS
EYELILASIKGELKGYAGALVRTLRILKQKVEGAVPVNPAGSIRRELEIIL
EDTPDVEVLKKIVNRNVPNPFRLVRGLLREAEGIEGIRVLVKGYDGSMDVY
YAIFYDEDGREIYRYPILAENGKYLVGFNLLKRISEVLSKEYKVVRGASEE
VDYKVKTLVMDNIYNLIVKKYLEYDSLNIKEGKIFKRLKVEIKKALEVKGI
SEEEFEVIKRVPPEIMEVLGLDSTKIELPTNEYLKIFERNFVPLDKILESE
KKAMEIVMELEKSRGYNVEDVSLREHYDIRAFTDGEEKYIEVKGHYPMLLL
AELTEKEFEFAQKNEDKYWIYIVSNIAKDPVIVKIYKPFSQDRRVFVVKNG
EDVEVNINIEIKKKDRHLLKLS

Title: Pfu REPLICATION ACCESSORY FACTORS AND METHODS OF
          USE
Inventors: Holly H. Hogrefe et al.
Application No.: Not Yet Assigned
Filed: April 20, 2004
Attorney Docket No.: 04121.0161-02000
Page 31 of 37 (Figure 34 and 35)

31 / 37

FIG. 34

VITLELHPSEIARYFELEECSHYFSNLLLRKRGELQEFEPIIRRKEIETIE
LAKWGDEFELSLLQEFKKGEALKKLGVKELPRFYGFLTENDTPVRKFFEKY
FKDGIIVEEDPDKLLEIINSEKSAVIYQAPLKGRIGKFDVSGRADFIIKVG
KTLYLLEAKFTKEEKFYHRIQAIIYAHLLSQMIEGYEIKLAVVTKENFPIP
SNFLRFPGDVEELKITLEEKLGGILREQELWIDARCTTCPFEALCLSKALE
ERSLGLLSLPPGIIRILKEEGIKDLKDMAKLFEFKENSPTNFEEPSIKDPK
KTQEIAKRTGINLLKLSRIAQAILKYLDEGETTPLFIPRTGYNLPMDERVG
DVEPSYYPPRSLVKVFFYVQTSPITDTIIGISALVKNRQNGERIIVKFVDE
PPIEVSDAQEKERMLLIEFFRDVIDAVKSLSPTDKVYLHMYFYNRKQRDDL
MDAVKRHKEIRENNAVMALLSLRRAIDWESFSIIKDEIIRRHALPLSPGLG
FVTVATQFGYRWRRNKTFARMLEVVARRENGKINLKTLLNISETGIGPEYY
PIIDRDNEGIPFTLFWSALVKLATEEDNSRIKRDIRDILSQMVEALKTIEE
RIPEQYKDAFVKKEGIPKEDLENFDIKKEELADILLEYLQLEFDARFRERS
EYYRLPLSIRAYSEESALIKIENIEKKKNDCLLFGKIVLIDENGRIKEYNP
KEVLIDIDEGSLVVVTPKKFLDKLRRDPVQRISKSPLGIVEAIDHETGKVV
IRLIRVSPGRFTLKHSKFSCKNGLLTITYPEGEVKVTPGEIVIVDPSVDDI
GMERAYNVLSEISQGELKHEIYQKVKAIYEGNTESRYEVNIWKKKHIEEFL
SRVKKINEEQKKFAIDINNFLVTLQGPPGTGKTSGAIAPAILARAYSMVKD
KKNGLFVVTGVSHRAVNEALIKTLKLKKELENTLKELRKIDLIRAVSGEEA
IKIIKEELEREIKDDVDRIRFTAQEITHSSKQRSLDKYFANSGTVRIVFGT
PQTLNKLMKNTKEVELVVIDEASMMDLPMFFLSTKVCKGQVLLVGDHRQME
PIQVHEWQLEDRKTFEEHYPFLSALNFIRFLRGELDERELKKFKRILGREP
PEWKKDKNEVLPLYRLVRTYRLPQEIADLLSDAIYRADGIKLISEKKKRRK
IIARHKDEFLSIVLDDRYPFVLILHDEGNSTKINELEAKIVEKIIKRVENI
DIGVVVPYRAQKRLIASLIDSAQVDTVERFQGGEKSLIVISMTSSDPRIPG
KGF

FIG. 35

MNIKSFINRLKELVEIEREAEIEAMRLEMKRLSGVERERLGRAILSLNGKI
VGEELGYFLVKYGRNKEIKTEISVGDLVVISKRDPLKSDLLGTVVEKGKRF
IVVALEPVPEWALRDVRIDLYANDITFKRWIENLDRVRKAGKKALEFYLGL
DEPSQGEEVSFEPFDKSLNPSQRKAIAKALGSEDFFLIHGPFGTGKTRTLV
ELIRQEVKRGNKVLATAESNVAVDNLVERLAKDGVKIVRVGHPSRVSRHLH
ETTLAYLITQHELYGELRELRVIGQSLAEKRDTYTKPTPKFRRGLSDAEII
KLAEKGRGARGLSARLIKEMAEWIKLNRQVQKAFEDARKLEERIARDIIRE
ADVVLTTNSSAALDVVDATDYDVAIIDEATQATIPSILIPLNKVDRFILAG
DHKQLPPTILSLEAQELSHTLFEGLIEKYPWKSEMLTIQYRMNERIMEFPS
REFYDGRIVADESVKNITLADLGIKVNASGIWRDILDPNNVLVFIDTCMLE
NRFERQRRGSESRENPLEAKIVSKIVEKLLESGVKAEMMGVITPYDDQRDL
ISLNVPEEVEVKTVDGYQGREKEVIILSFVRSNKAGEIGFLKDLRRLNVSL
TRAKRKLIMIGDSSTLSSHETYRRLIEHVREKGLYVVLTKDSI

Title: Pfu REPLICATION ACCESSORY FACTORS AND METHODS OF
USE
Inventors: Holly H. Hogrefe et al.
Application No.: Not Yet Assigned
Filed: April 20, 2004
Attorney Docket No.: 04121.0161-02000
Page 32 of 37 (Figures 36 and 37)

32 / 37

ATPase ASSAY FROM PHAGE INDUCED HELICASES

$\longleftarrow$ ^{33}P

$\longleftarrow$ $^{\gamma 33}$P-ATP

1   2   3   4   5   6   7   8   9   10
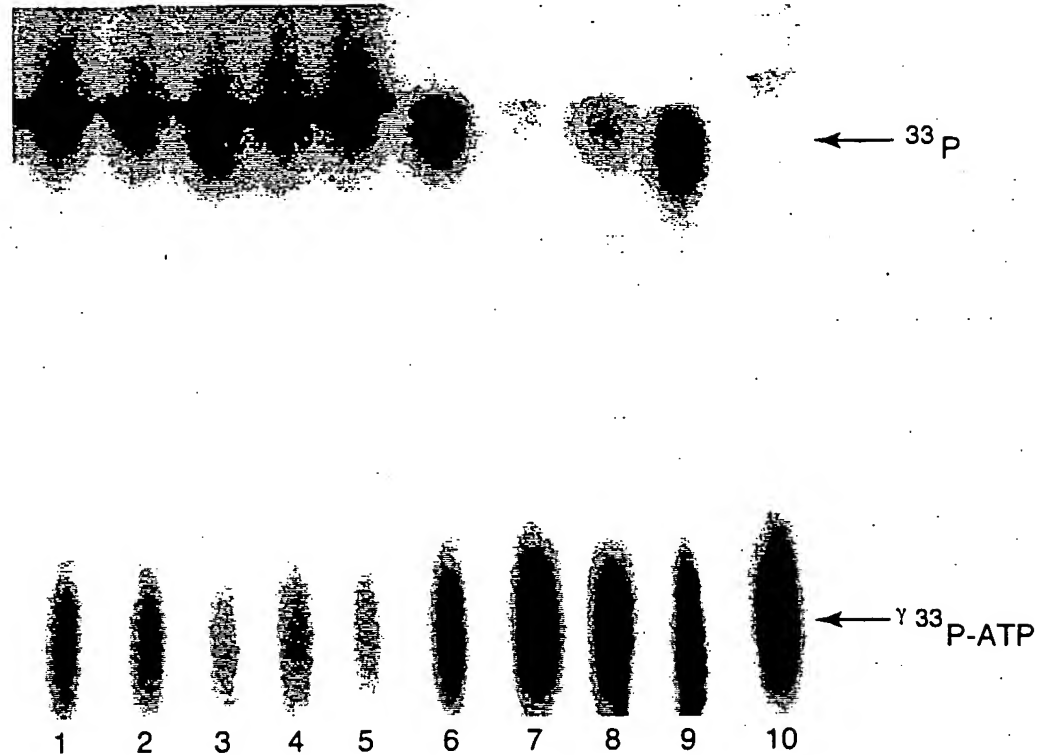
FIG. 36

ATPase ASSAY FROM IPTG INDUCED HELICASES

$\longleftarrow$ ^{33}P

$\longleftarrow$ $^{\gamma 33}$P-ATP

1   2   3   4   5   6   7   8   9

FIG. 37

Title: Pfu REPLICATION ACCESSORY FACTORS AND METHODS OF USE
Inventors: Holly H. Hogrefe et al.
Application No.: Not Yet Assigned
Filed: April 20, 2004
Attorney Docket No.: 04121.0161-02000
Page 33 of 37 (Figures 38A and 38B)

FIG. 38A

FIG. 38B

Title: Pfu REPLICATION ACCESSORY FACTORS AND METHODS OF
USE
Inventors: Holly H. Hogrefe et al.
Application No.: Not Yet Assigned
Filed: April 20, 2004
Attorney Docket No.: 04121.0161-02000
Page 34 of 37 (Figure 39)

34 / 37

FIG. 39

Title: Pfu REPLICATION ACCESSORY FACTORS AND METHODS OF
USE
Inventors: Holly H. Hogrefe et al.
Application No.: Not Yet Assigned
Filed: April 20, 2004
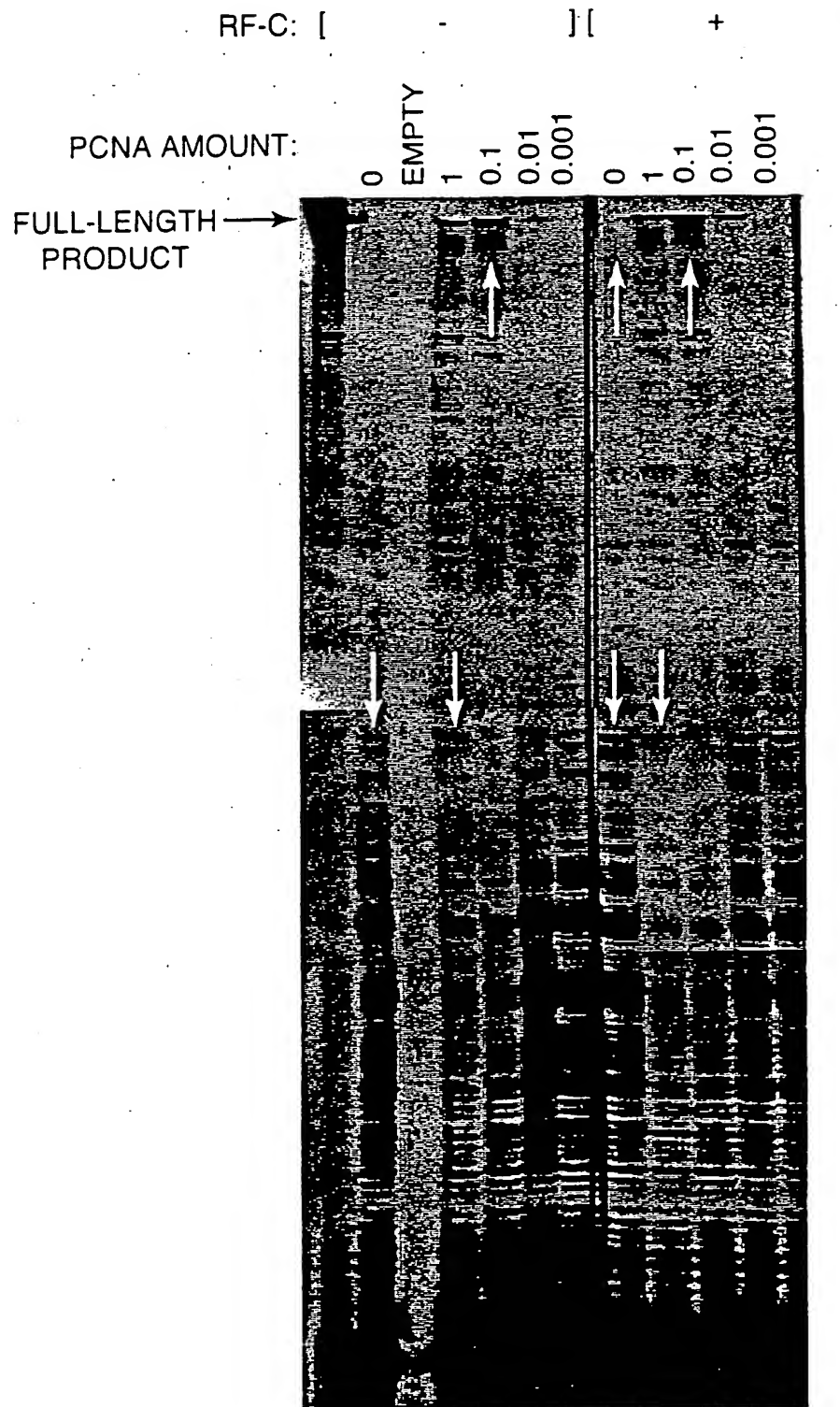Attorney Docket No.: 04121.0161-02000
Page 35 of 37 (Figure 40)

35 / 37

FIG. 40

ATGAGGGTTGATGAGCTGAGAGTTGATGAGAGGATAAAGAGTACTTTGAAG
GAGAGAGGTATCGAATCCTTTTACCCTCCCCAAGCCGAGGCCTTAAAGAGC
GGGATATTGGAAGGTAAGAATGCATTAATTTCAATTCCAACGGCCAGCGGA
AAAACACTAATTGCTGAGATTGCCATGGTTCATAGGATTTTGACCCAGGGA
GGAAAGGCTGTATACATAGTCCCGCTGAAGGCCTTGGCTGAAGAAAAGTTT
CAGGAGTTCCAGGATTGGGAGAAGATTGGGTTAAGAGTAGCGATGGCCACT
GGGGATTACGACTCAAAGGATGAGTGGTTGGGGAAATACGACATAATCATT
GCGACGGCTGAGAAGTTTGATTCCCTTTTAAGGCATGGCTCAAGTTGGATT
AAGGATGTGAAGATTTTAGTTGCTGACGAGATTCATTTGATTGGTTCAAGA
GACAGAGGAGCTACGCTTGAAGTTATCCTAGCTCATATGCTCGGAAAGGCC
CAAATAATTGGACTCTCTGCAACGATAGGAAATCCAGAGGAGCTTGCGGAG
TGGTTAAATGCCGAGCTAATAGTCAGTGACTGGAGGCCCGTTAAGCTTAGA
AGGGGAGTTTTTTACCAAGGCTTTGTTACCTGGGAAGATGGAAGTATAGAC
AGGTTTTCCTCCTGGGAAGAGTTAGTTTACGATGCAATTAGGAAGAAGAAA
GGAGCGCTAATTTTTGTAAACATGAGAAGGAAGGCTGAGAGAGTAGCTTTG
GAGCTTTCTAAAAAAGTTAAGTCTCTCCTCACGAAACCTGAGATTAGAGCT
TTAAATGAATTGGCTGATTCCCTCGAGGAAAATCCCACAAATGAAAGCTA
GCTAAGGCCATTAGGGGTGGAGTTGCGTTCCACCACGCTGGTCTTGGGAGA
GATGAGAGGGTTCTCGTGGAGGAGAACTTTAGAAAGGGTATAATAAAGGCC
GTAGTTGCCACCCCAACACTTTCGGCGGGAATTAACACTCCAGCGTTTAGG
GTGATTATAAGGGATATTTGGAGGTACTCTGACTTTGGAATGGAGAGAATT
CCGATAATCGAGGTTCACCAAATGCTTGGGAGAGCTGGAAGGCCGAAGTAT
GATGAGGTTGGGGAGGGAATAATAGTTTCTACAAGCGATGATCCGAGAGAG
GTAATGAATCACTACATATTTGGAAAGCCTGAAAAACTGTTCTCCCAGCTC
TCCAACGAGAGTAATTTGAGAAGTCAAGTTTTGGCCCTAATAGCGACCTTT
GGCTATTCAACTGTGGAGGAGATTTTGAAGTTCATCTCAAACACATTCTAT
GCTTATCAAAGGAAGGACACATACTCTTTAGAGGAGAAGATAAGGAACATA
CTCTACTTCCTCCTAGAGAATGAGTTCATAGAGATATCCTTAGAGGATAAA
ATAAGGCCGCTTTCCCTGGGAATTAGGACTGCAAAGCTTTATATCGATCCC
TATACGGCCAAGATGTTCAAGGATAAAATGGAGGAAGTTGTTAAAGATCCA
AATCCTATAGGAATATTTCACTTAATCTCCCTAACTCCGGATATAACCCCC
TTCAACTACTCAAAGAGAGAATTTGAAAGGCTCGAAGAGGAATACTACGAA
TTCAAGGATAGGTTATACTTTGACGATCCCTACATTTCGGGTTACGACCCC
TACCTAGAGAGGAAGTTCTTCAGAGCTTTCAAAACTGCACTAGTGCTTCTG
GCATGGATAAATGAAGTCCCTGAGGGAGAAATAGTTGAAAAGTACTCGGTG
GAACCTGGGGACATCTATAGGATAGTTGAGACGGCTGAGTGGCTGGTGTAC
TCTCTAAAGGAAATTGCAAAAGTTCTTGGAGCTTATGAGATCGTTGATTAT
CTTGAAACATTGAGGGTTAGGGTCAAGTATGGGATTAGGGAGGAATTGATT
CCCCTAATGCAACTCCCGTTGGTTGGAAGAAGGAGAGCTAGAGCTCTTTAC
AATAGCGGATTTAGAAGTATAGAGGATATATCTCAAGCGAGGCCAGAAGAG
CTTTTGAAAATCGAGGGGATAGGGGTCAAGACCGTTGAGGCTATCTTCAAG
TTTCTTGGTAAGAATGTGAAAATTTCGGAGAAACCTAGAAAAAGTACCCTT
GATTACTTTCTCAAATCTTGA

Title: Pfu REPLICATION ACCESSORY FACTORS AND METHODS OF
USE
Inventors: Holly H. Hogrefe et al.
Application No.: Not Yet Assigned
Filed: April 20, 2004
Attorney Docket No.: 04121.0161-02000
Page 36 of 37 (Figure 41)

36 / 37

FIG. 41

MRVDELRVDERIKSTLKERGIESFYPPQAEALKSGILEGKNALISIPTASG
KTLIAEIAMVHRILTQGGKAVYIVPLKALAEEKFQEFQDWEKIGLRVAMAT
GDYDSKDEWLGKYDIIIATAEKFDSLLRHGSSWIKDVKILVADEIHLIGSR
DRGATLEVILAHMLGKAQIIGLSATIGNPEELAEWLNAELIVSDWRPVKLR
RGVFYQGFVTWEDGSIDRFSSWEELVYDAIRKKKGALIFVNMRRKAERVAL
ELSKKVKSLLTKPEIRALNELADSLEENPTNEKLAKAIRGGVAFHHAGLGR
DERVLVEENFRKGIIKAVVATPTLSAGINTPAFRVIIRDIWRYSDFGMERI
PIIEVHQMLGRAGRPKYDEVGEGIIVSTSDDPREVMNHYIFGKPEKLFSQL
SNESNLRSQVLALIATFGYSTVEEILKFISNTFYAYQRKDTYSLEEKIRNI
LYFLLENEFIEISLEDKIRPLSLGIRTAKLYIDPYTAKMFKDKMEEVVKDP
NPIGIFHLISLTPDITPFNYSKREFERLEEEYYEFKDRLYFDDPYISGYDP
YLERKFFRAFKTALVLLAWINEVPEGEIVEKYSVEPGDIYRIVETAEWLVY
SLKEIAKVLGAYEIVDYLETLRVRVKYGIREELIPLMQLPLVGRRRARALY
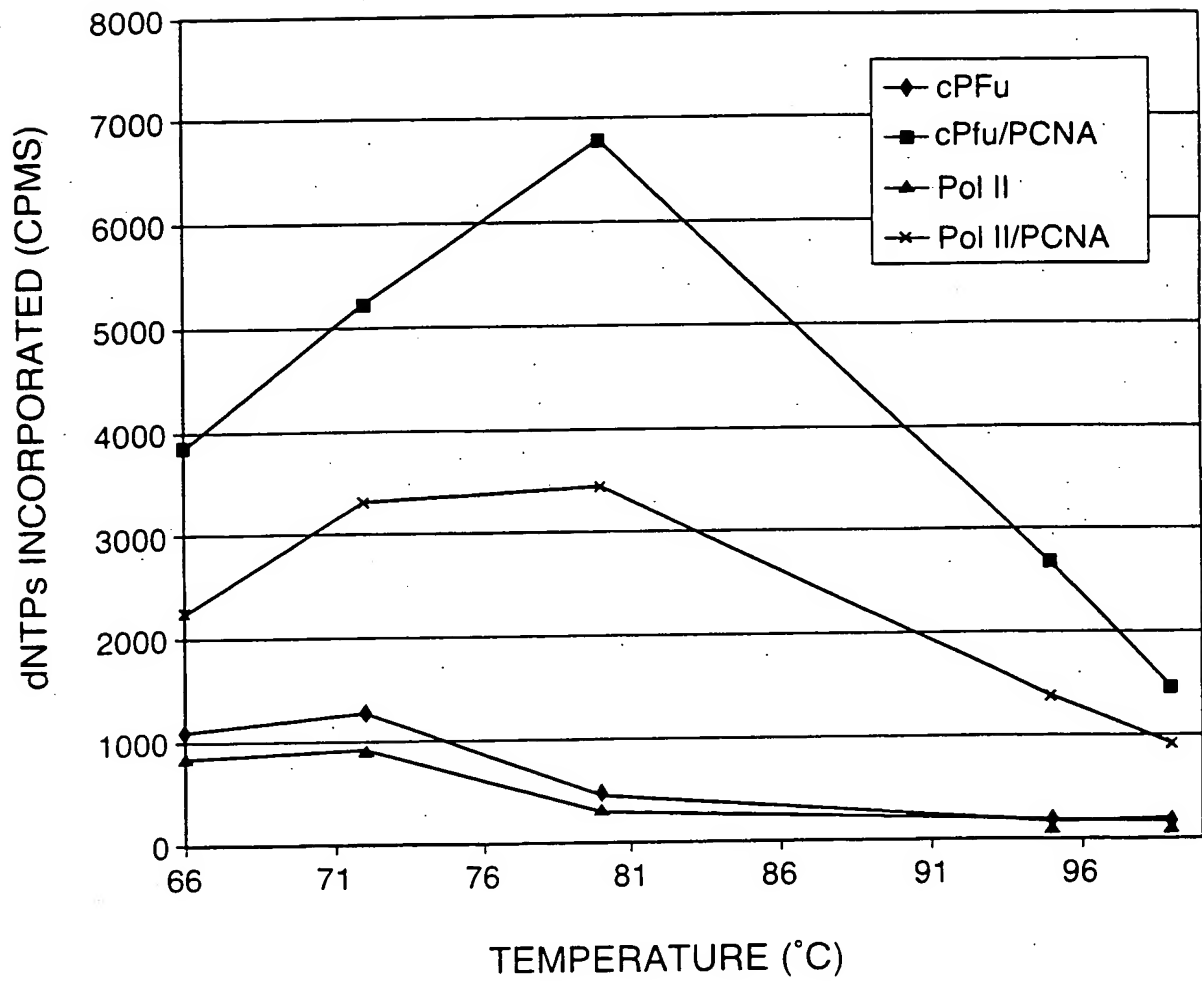NSGFRSIEDISQARPEELLKIEGIGVKTVEAIFKFLGKNVKISEKPRKSTL
DYFLKS

Title: Pfu REPLICATION ACCESSORY FACTORS AND METHODS OF
        USE
Inventors: Holly H. Hogrefe et al.
Application No.: Not Yet Assigned
Filed: April 20, 2004
Attorney Docket No.: 04121.0161-02000
Page 37 of 37 (Figure 42)

37 / 37

FIG. 42